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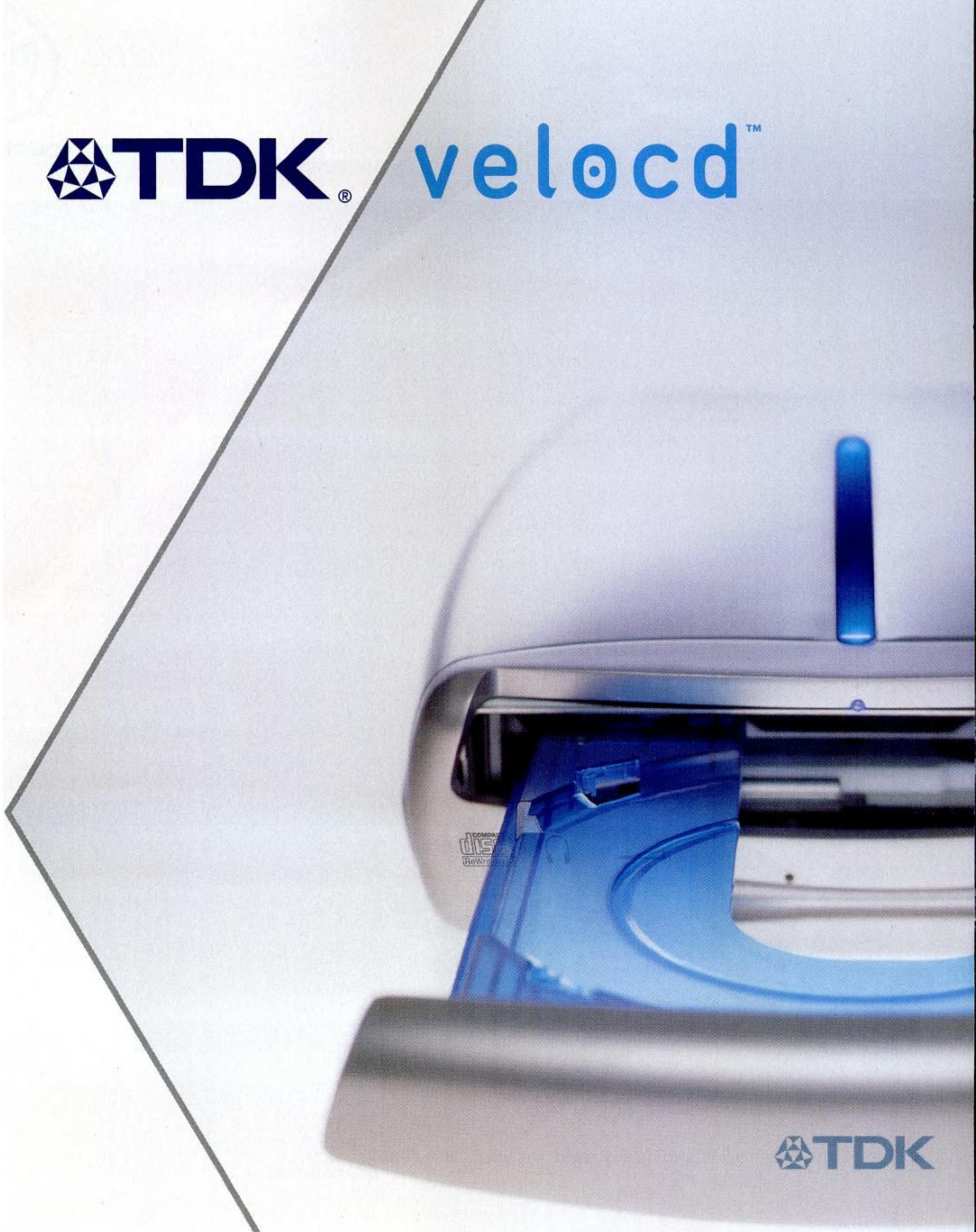

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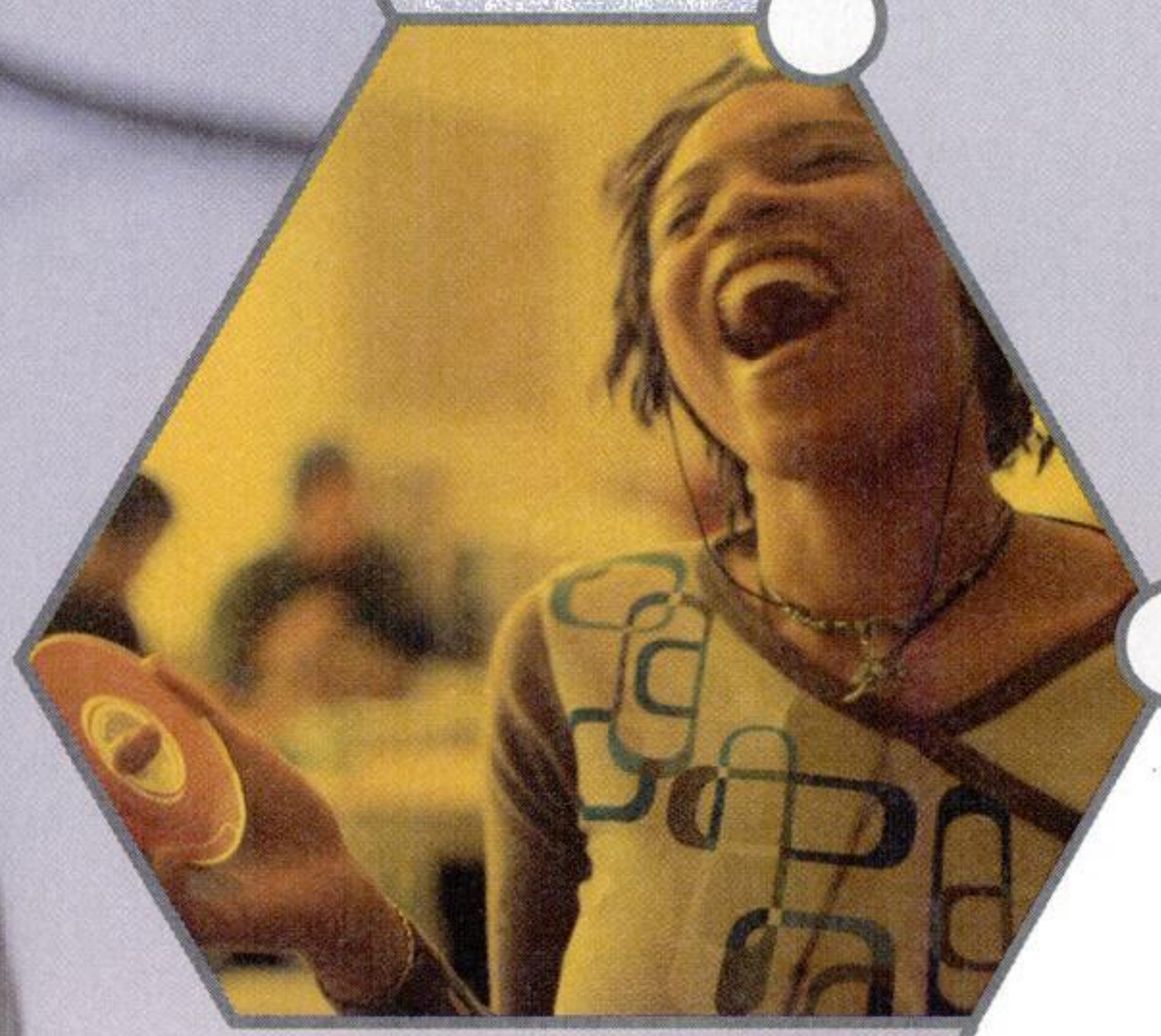

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MAY 2001

THIS ISSUE

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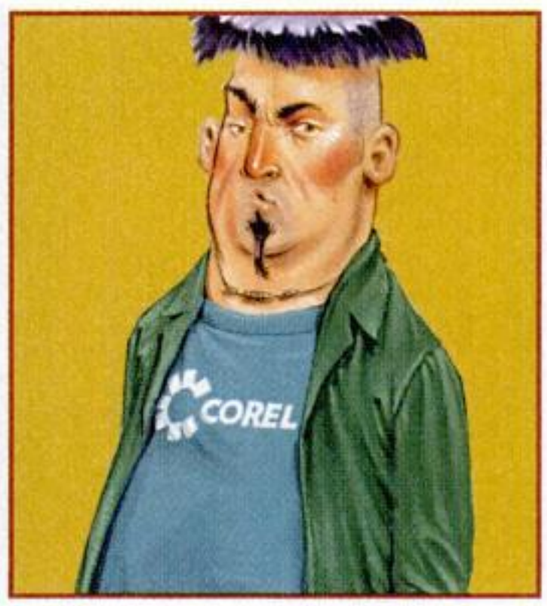

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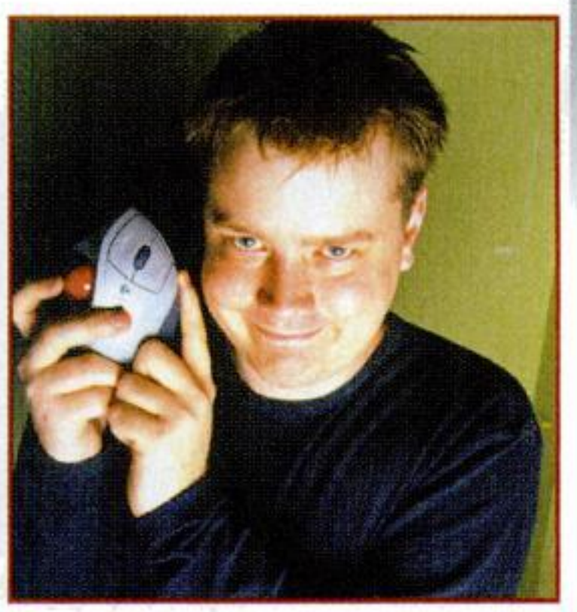

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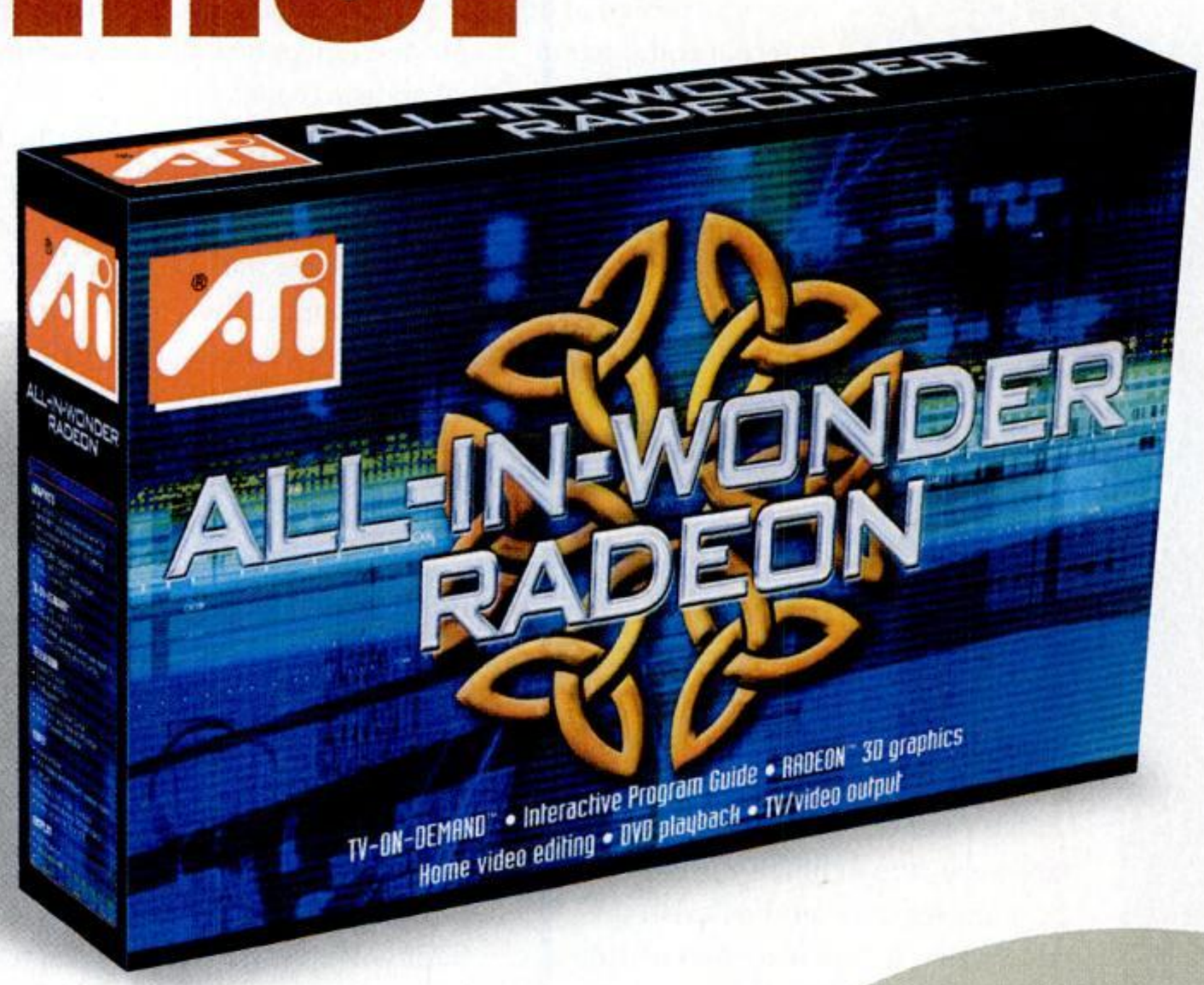
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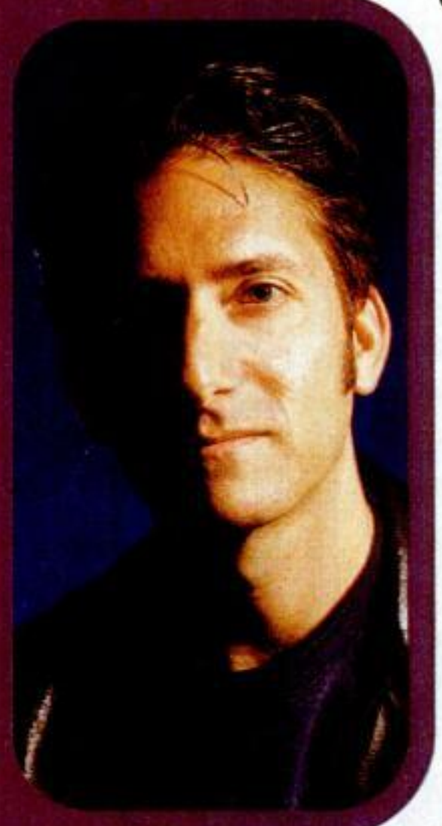
EDWORD

Exclusive Preview: Maximum PC V.2



If the automobile industry evolved as quickly as the PC industry, by now we'd all be commuting in airspace like George Jetson. But the essential design of the internal combustion engine hasn't radically changed during the past 100 years, and engineers haven't found a better way to move us from Point A to Point B than simply plopping us down on four patches of rubber and propelling us on our merry ways. And thus car magazines have never been compelled to change their approach to covering cars. Indeed, whether we're reading about the new Dodge Viper or the new Toyota minivan, we're sure to find information on the same features, addressed in the same order: first power, then handling and comfort. The formula never seems to vary.

But PCs aren't cars. They *have* changed radically since their inception, and the pace of this evolution has increased dramatically in the last 12 months. So it's time for PC magazines to change as well—to remain relevant and to inform new legions of consumers about the best and worst products available.

If you've been reading my column for the past few issues (and if you have, you deserve the Purple Heart), then you know I've been hinting at big changes in the PC industry as well as in *Maximum PC*. Well, in next month's issue, the two institutions will converge, and the magazine will report on, well, convergence like it never has before. This means increased coverage in three key areas:

▶ PC entertainment. For example, PC gaming, PC home-theater systems, and MP3 products.

▶ PC connectivity. We're talking PDAs, home networking kits, and broadband services, to name just a few.

▶ PC creativity. In other words, digital video production, image editing, music production, and all the other content creation activities that leverage PC power.

As the lists above illustrate, the PC is converging with a bunch of products and activities that used to bop along on their own. And now that the PC serves as the hub enabling all these wonderful amenities, *Maximum PC* is announcing to the world that the new PC landscape is its own sovereign domain. To properly christen our new mission, we're redesigning the magazine for next month's issue (see the sneak peak on page 96), tweaking the direction of our features, and changing our slate of regular departments.

The "new" *Maximum PC* will still cover basic PC upgrading, but we'll recognize the fact that in this age of 1.5GHz CPUs and insanely future-proof videocards, "upgrading" often means the addition of useful features, but not the addition of extra power. Case in point: Right now, I personally wouldn't upgrade my 733MHz P-III, but I'd love to ditch my old CD recorder for a faster one that includes Burn Proof technology. The new *Maximum PC* will still have a Dream Machine issue in September. But instead of building a single power box, we'll build *three* power boxes, each one dedicated to a specific PC activity.

In this age of 1.5GHz CPUs, "upgrading" often means the addition of useful features, but not the addition of extra power.

Maximum PC has always used the "muscle car" metaphor to define its passion for computers and components, but even this must change. Every car on Earth essentially does one single thing—it transports passengers from one place to another. But more so than ever before, PCs are multi-tasking wonders that mean many different things to many different people. It's time we begin covering this universe of possibilities with all the cut-to-the-chase candor you've come to know and love.

—Jon Phillips

MAXIMUM PC

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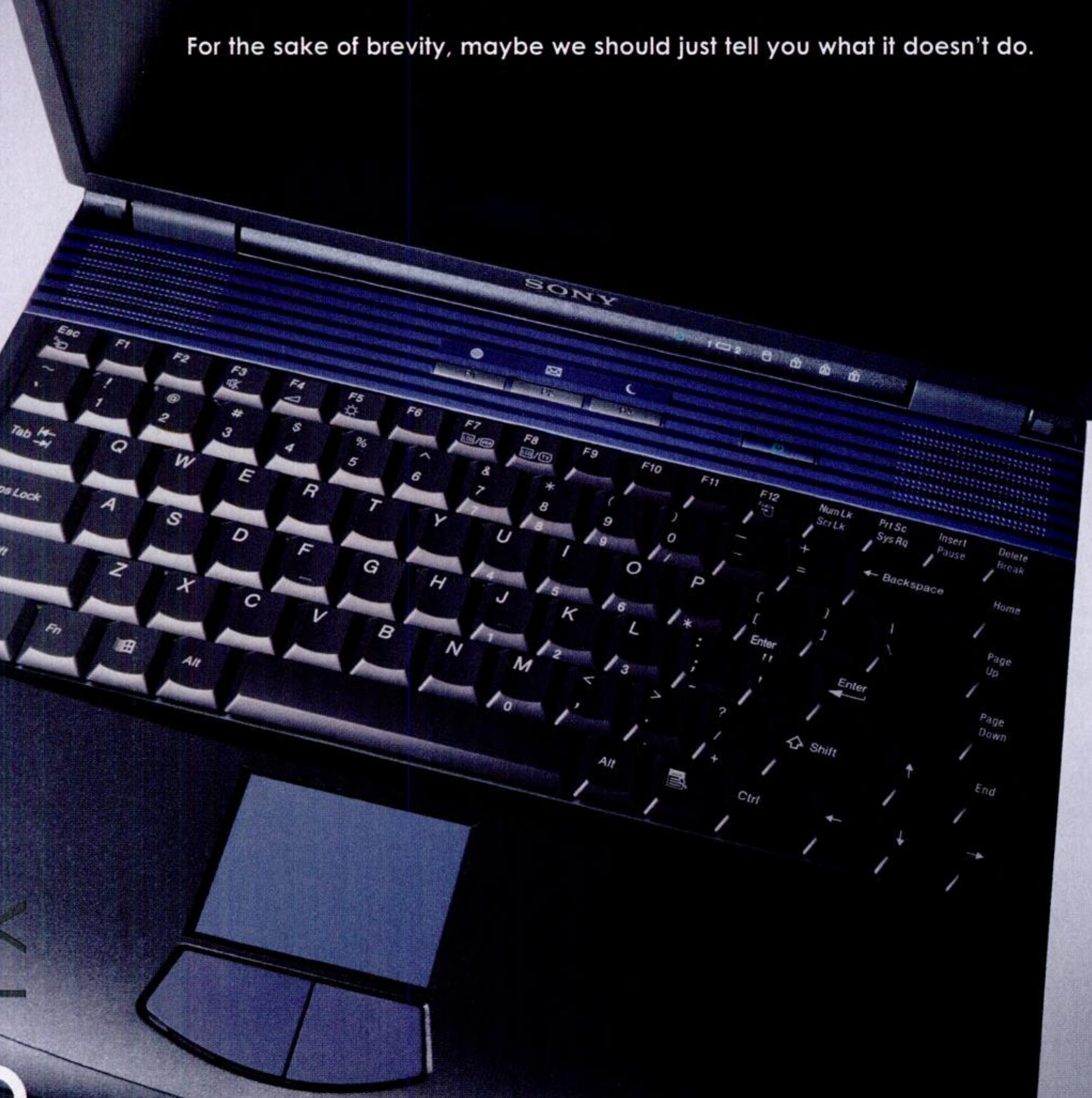

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COMMPORT

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Someone Forgot to Take His Happy Pills...

If you're a regular reader of this section, you're aware that its creation is something of a joint effort among all the editors of *Maximum PC*. The process is a simple one: Your letters are forwarded to the appropriate editor, and he or she takes a crack at providing a response that makes some sort of sense. That response is then forwarded to whoever is editing CommPort for that given issue (usually Editor-in-chief Jon Phillips, occasionally Features Editor Kristen Salvatore).

Probably due to the fact that he wrote our April 01 cover story on the GeForce3, the vast majority of letters we've received in the past month have been forwarded to Technical Editor Will Smith. Now, Will is ordinarily spot-on with his responses and is generally a pretty nice guy. But maybe he's had his fill for now, because virtually every response he submitted this month was, frankly, fraught with more bilious venom than factual advice. In fact, we were forced to tweak almost every one of them (which explains why we're publicly humiliating Will here). If you were one of the unlucky folks on the receiving end of Will's angry stick, rest assured that we're staging an intervention, sending him to anger management classes, and taking turns slipping Zoloft into his Mr. Pibb.

Who You Calling Canine?

Do you guys have the hearing of dogs? I ask because, in the article "Anatomy of an MP3 File" [March 01], you incorrectly state that "...some encoders throw out frequencies over 16KHz, which are still within the audible range for most people." In fact, no human being is capable of hearing sounds up to 16KHz; most of them have hearing limits of less than 12-15KHz. Dogs, on the other hand, are perfectly capable of hearing sounds at 16KHz and beyond.

—Danny Yee

Technical Editor Will Smith lays down the smack: Hey, Danny! Before you go rudely running off at the mouth, you might want to check your facts. Otherwise, you'll look like a dumbass. See, while we were following up on your little factoid, we hit the *Encyclopedia Britannica*. Guess what? It corroborated our version of the story, noting that the range of human hearing is between 20Hz and 20KHz. Infants and young children can hear sounds up to 22KHz, but time eventually takes its toll, so the elder among us have hearing that tops out at about 18KHz.

Of course, we don't really trust the British, so just to be certain, we spoke with a man who's intimately familiar with all things canine: Charles Grodin, star of the *Beethoven* movies. Here's his response: "Why are you asking me this? What kind of loser cares about this sort of thing? What, you mean someone wrote a letter to the editor about it?" Once he had us cornered, he also rambled on incessantly about how the American public wasn't ready for his talk show. Why does any of this matter? Charles' movie career may be sagging, but he's right about one thing: You're a loser.

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"I caught the program trying to dial out four separate times before I finally gave up and uninstalled it!"

Useless FPS?

Let me get this straight: We have videocards that will generate over 100fps, yet most of our monitors operate at only 75Hz. What's the point of being able to generate 100 frames per second when your monitor can only display 75 of them? Am I misunderstanding something?

—Andrew Underwood

Editor-in-chief Jon Phillips responds: Actually, you *are* misunderstanding something. Good monitors can hit refresh rates as high as 160Hz at low resolutions such as 640x480 and 800x600, which is where most games end up being set. The lower you set your resolution, the higher you can set your refresh rate, and this is true for any monitor. For example, a typical high-end monitor might do 160Hz at 800x600, 105Hz at 1280x1024, and 90Hz at 1600x1200. At *Maximum PC*, all of our monitors can hit between 80 and 85Hz at 1600x1200, and that's quite fast enough should we ever need to run our games at such a videocard-crushing resolution.

By the way, for regular 2D work, I suggest you set your monitor to 80-85Hz, at the resolution you're most comfortable with (I like 1280x1024 on my 21-inch display). This refresh rate is fast enough to preclude eye-straining flicker, but not so fast that the display actually loses definition on sharp edges.

RealEspionage

In your March 01 issue, you not only touted *RealJukebox* with an 8 verdict, but you also put a copy of the *RealPlayer* demo on the Maximum CD. I tried the demo and thought that it was OK, so I bought copies of *RealPlayer* and

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RealJukebox, installed them on my computer, and settled in for some good vibes. Instead, I found that paying for the product didn't get rid of the built-in advertisements, and there's no way to turn them off. The next thing I found out is the whole setup is essentially spyware—I caught the program trying to dial out four separate times before I finally gave up and uninstalled it! If you can prove me wrong I humbly apologize, but if I'm correct, you owe your readers full disclosure.

—Jack Keaka

David Brotherton of RealNetworks responds: I want to assure you that RealNetworks values its customers and is committed to protecting their individual privacy. As to the specific concerns about "dialing out" and "spyware" at the time of install, users are presented with a full explanation of all communication between the client and server. We provide extensive and detailed information about everything that is transmitted, and we offer users the ability to change their decisions or preferences at any time via the preferences dialog box. All of *RealPlayer's* automatic features—including StartCenter (which runs in the Windows system tray and is used to help improve startup time and to manage several automatic Internet communications), electronic product registration, checks for new Channels and Channel headlines, messages for those who have signed up for the Real.com Message service, and software updates—can be disabled from within the View menu.

Bigger-Bank Hardware?

Why doesn't *Maximum PC* ever review 3DLabs videocards? I maintain and upgrade CAD workstations, and we use only 3DLabs cards.

From what I've seen lately, you haven't held back from reviewing expensive/cutting-edge technologies. Is your advertising revenue an issue? The Oxygen VX1 AGP card is comparable in price to a GeForce, yet you used the Permedia Create card in a comparison of different vendors' cards about six months ago.

—Anand Athavale

Technical Editor Will Smith replies: We don't often review 3DLabs cards because they're essentially worthless for games, compared to the cheaper, consumer-oriented cards such as the GeForce and the Radeon. Though 3DLabs cards offer superior z-buffer precision and other advanced CAD features, they don't offer the raw fill rate of dedicated gaming cards.

It's true that we've reviewed really expensive hardware in the past, but that hardware has always offered something to Joe Consumer that he may not know he can get—or it could have just been a really cool piece of hardware. Unfortunately, the 3DLabs boards are neither overtly cool nor particularly useful to the average consumer. And, for the record, contrary to bum folk wisdom, our advertising and review teams are completely separate entities. *Maximum PC* has *never, ever* accepted ad revenue in exchange for a product review.

Noodling with the Numbers

Your analysis of the performance differences between Pentium 4 motherboards that ran in the April 01 issue is a perfect example of why you shouldn't skip statistics class to go smoke under the bridge. You slammed the Intel board [in comparison to the Asus and MSI boards], but the benchmark scores clearly show the performance differences between all three are statistically insignificant. Despite the fact that Intel's board showed better results in just one test, in half of the benchmarks the performance of all three boards differs by less than 1 percent. I'm not an Intel shill or an enemy of Asus, but there are times when you have to simply say that the boards perform nearly identically.

In those cases, you need to base your choice on overclockability. To conclude that the Intel board is an "uninspiring pile of silicon" based on such small differences in benchmark scores is just patently unfair.

—Jeff Dillon

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Editor-in-chief Jon Phillips replies: Your comment about the statistical insignificance among the benchmark results is warranted. We would have better served our readers by noting that a 1 percent differential isn't anything to get huffy about. But the fact remains that many of our readers *do* care about such minute performance issues—our sin was in getting caught up in the same nit-picking and forgetting what we learned in statistics class.

Now, all that stated, the Intel board still would have received a 6 verdict for its legitimate drawbacks (lame overclocking features, lack of an AGP Pro slot, and frustrating board layout). And in our defense, we did praise the D850GB for its stability—the main reason anyone would ever want to buy an Intel mobo.

One Helluva Screwdriver

In "Tools of the Trade" [April 01], the first item highlighted is a Snap-On screwdriver that sells for nearly $100. I did a double-take and checked Snap-On's site (**www.snapon.com**) to verify that price. Why on earth would anyone pay $100 for a screwdriver? You could buy 256MB of RAM and still have enough left over to get a generic screwdriver that's just as good at turning screws. I'm sure that it's a very nice screwdriver, but I can't imagine it being *that* good

—Brad Smalley

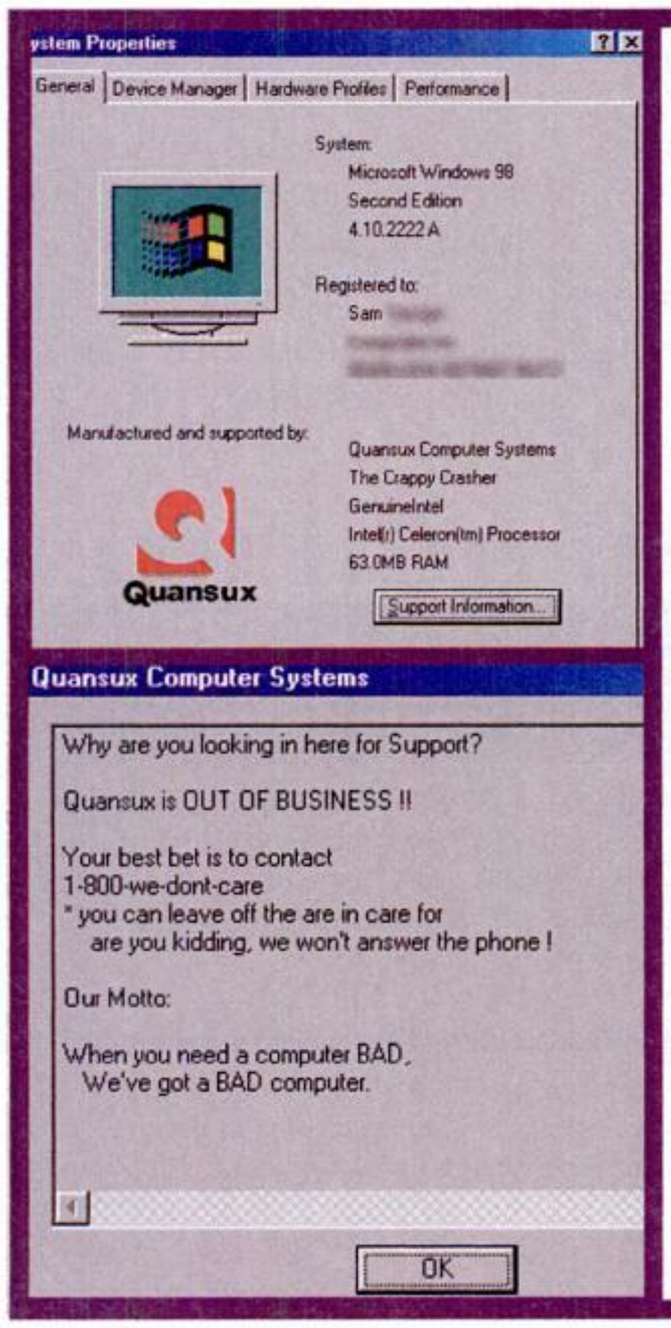
Associate Technical Editor Scott Tarr responds: We understand what you're saying, Brad, but 256MB of PC133 SDRAM will last you how long? Two, maybe three years? With DDR and RDRAM vying for your memory architecture in the next year, your $100 investment will drop like a rock to the bottom of the ocean in no time. With the Snap-On screwdriver, you get the best quality available this side of a government-surplus warehouse. You also get an heirloom that can be passed down to your grandchildren, since Snap-On offers a lifetime warranty. And you can't say that about 256MB of RAM, now can you?

Magnetic Appeal?

In the April 01 "Tools of The Trade" article, you describe a Snap-On magnetic screwdriver. Let me repeat: MAGNETIC! Don't magnets screw up data on hard drives?

—Scott

Associate Technical Editor Scott Tarr responds: Sorry, Scott, but your point's not really a valid one. The Snap-On screwdriver's magnet isn't of the two-ton variety—it's just magnetic enough to keep screws from falling off the end of the screwdriver, not enough to alter the data on your hard drive. On the other hand, your floppy disk is at risk if you place the screwdriver's magnet too close to it, but who uses floppies these days anyway?



See Sam Slam

Finally, I have a simple way to vent my frustration at Quantex computers. All I had to do was follow your instructions about oemlogo.ini and oemlogo.bmp [Ask the Doctor, April 01]. Now I look at my system properties and chuckle, even if it's only to myself.

—Sam Savoye

Fun with Math!

While your article on the GeForce3 was very interesting, your test figures don't add up. You claim the card shines in your *AquaNox* benchmark test by saying the GeForce3 performs 78 percent better than the GeForce Ultra card when used with a P-III 733, and 75 percent better when used with a P4 1.4GHz. But the Ultra card ran at 4.5fps and the GeForce3 ran at 20.3fps. Now, I'm 41 years old and a father of four, but I don't think my brain is so dead that it can't tell that these numbers add up to a 300 percent performance increase. If I'm wrong, could you explain the type of math you're using to get your 78 percent figure? (Just for the record, I don't work for nVidia, nor do I intend to buy the GeForce3.)

—Daniel

Technical Editor Will Smith responds: Well, Daniel, the way we calculate the 78-percent performance difference is with the standard percent difference formula we learned in 10th grade chemistry class. (Hi, Mrs. Schartung!). The formula is this: (x - y)/x X 100 = percent difference, where x is the higher number and y is the lower number.

Love's Labours Lossy

If MP3 is a "lossy" compression format (according to your recent MP3 coverage ["Anatomy of an MP3 File," March 01]), how is it possible to re-create CD-quality formatted audio?

—Karly

Technical Editor Will Smith responds: The CD-quality compression setting in most encoders is a qualitative setting, not a quantitative setting. When your encoder rips a WAV file to a compressed audio format, it compresses it while retaining the same clarity and range as that found on a CD. Some of the information gets lost, but, theoretically, it's information that you aren't capable of hearing anyway.

Unfortunately, there's no easy way to measure "CD-quality" sound. Pete Townshend may think a WMA file encoded at 64kbps sounds as good as a CD, while your more discerning ear may think it sounds like crap. We generally recommend encoding MP3s at 160kbps and WMA files at 128kbps to ensure CD-quality recording. ✹

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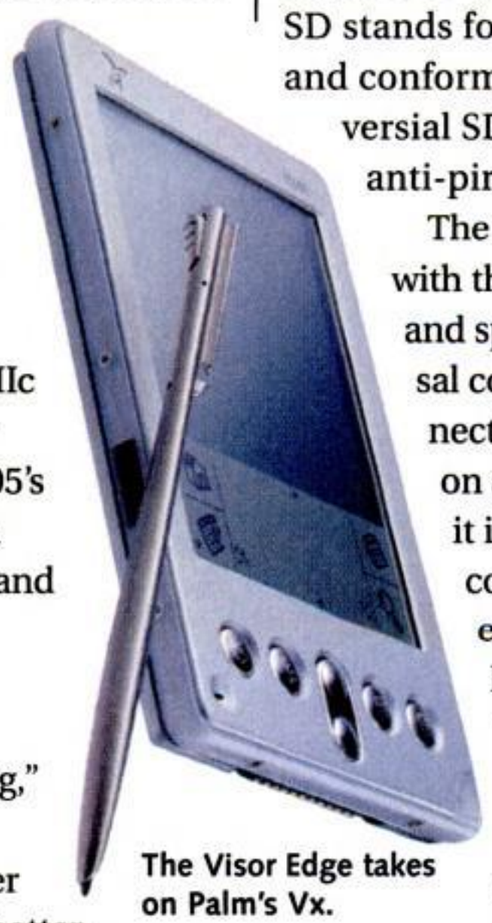
The Best PDAs Ever?

Better color and storage slated for latest handhelds

Put your cash in a lockbox, folks, because the PDA makers are adding so many features to their latest devices, you'll be tempted to hand your wallets directly to them. The main players are Palm, Compaq, and Handspring, and they're all revamping their product lines with better color, more memory, and removable storage.

The most significant PDA product release this spring is undoubtedly Palm's new M505. Designed as the successor to the popular Palm Vx, the M505 uses a 16-bit color screen similar to Compaq's iPaq. Unlike the Palm IIIc (Palm's first color offering), the M505's screen can switch between back-lit and reflective modes.

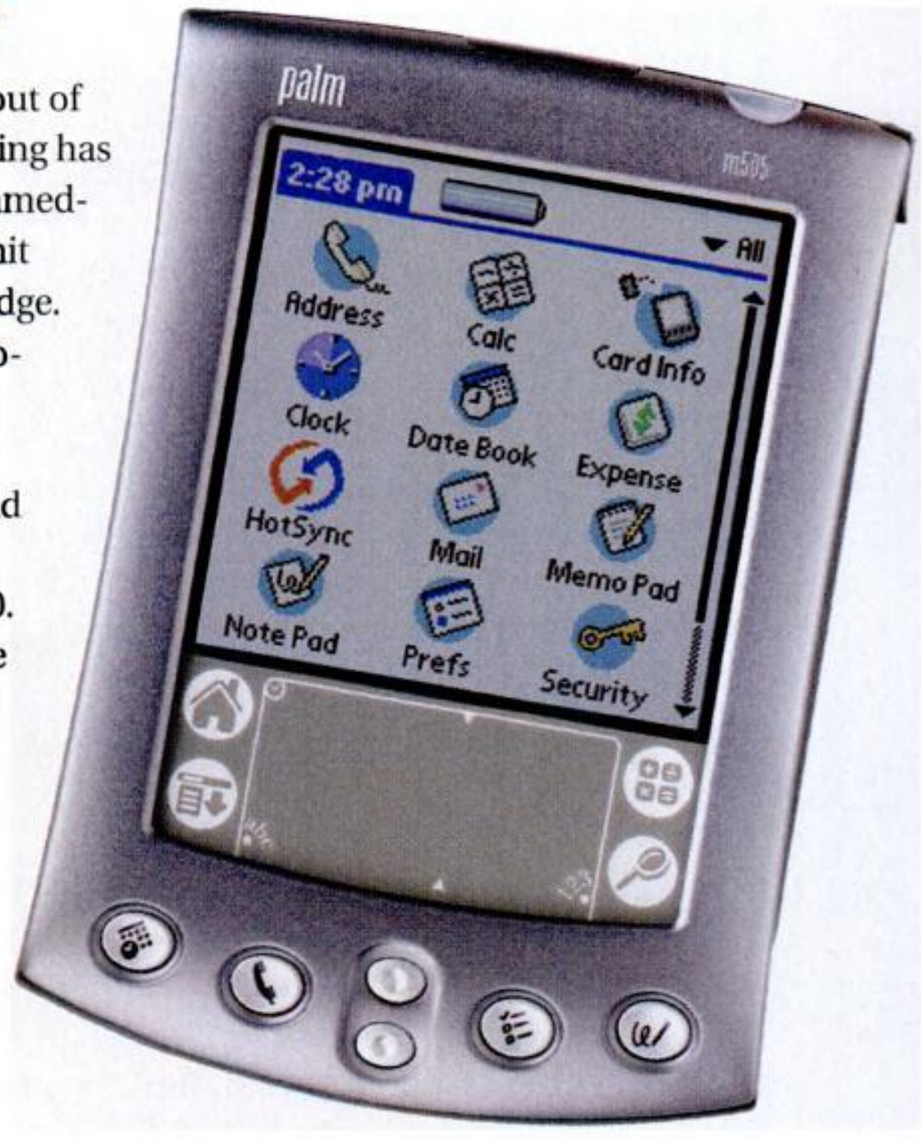


The Visor Edge takes on Palm's Vx.

Keeping with Palm's mantra, "battery life is king," the M505 uses thinner and lighter lithium polymer batteries that should give the M505 about the same run time as a Palm Vx. Standard memory on the M505 will be 8MB, but Palm is adopting an SD module port that supports postage-stamp-sized memory cards—perfect for storing applications and large database files. The SD port is compatible with existing MultiMediaCards (MMC) and will allow developers to create Bluetooth, GPS, and camera modules that slip into the port. SD memory will initially be available in sizes up to 64MB, but is expected to reach 1GB within two years. SD stands for "secure digital" and conforms to the controversial SDMI and CPRM anti-pirating standards.

The M505 will ship with the new Palm OS 4.0 and sport a new universal connector. The connector will be standard on all new Palms, but it is not physically compatible with the existing Palm V and Palm III cradles. The M505 is expected to be available this spring for $450. A monochrome version with 8MB of memory and the same 33MHz Motorola processor will run $400.

Not to be left out of the fray, Handspring has introduced a slimmed-down Palm OS unit called the Visor Edge. The Edge is monochrome, features the same 33MHz Motorola CPU and 8MB of memory, and will cost $400. To reduce the size of the Visor Edge, Handspring ditched its Springboard interface in favor of an edge connector. Springboard modules can be added to the Visor Edge using a bulky adapter, if you're so inclined.



Palm's new M505 adopts a Secure Digital/MMC slot that allows you to add bags of memory to the unit. It also sports a spiffy new color screen.

Though both products are advances for the Palm platform, the hardware upgrades may not be enough to keep Microsoft at bay. With the latest version of its portable OS, Microsoft may have finally won consumer acceptance of WinCE. In January, Palm sales slipped from 65 percent to 60 percent as CE-enabled Pocket PC devices crept up slightly. Users and analysts have long criticized Palm for moving too slowly. For example, while Palm added the memory slot and moved to a 33MHz CPU, Compaq increased its iPaq to 64MB of memory, added a dual PCMCIA card slot, and offered a 206MHz processor. The H3670 version of the iPaq will set you back $650.

SPIN CYCLE

This month's top stories broken down ►

HEADLINE	NEWS	DETAILS	THE SPIN	OUR TAKE
DVD Encryption Decrypted	Demonstrating the inherent weakness of anti-piracy protection on DVD movies, two students have written a seven-line PERL script that strips off the protection.	MIT students Keith Winstein and Marc Horowitz wrote the code for a class on DVD encryption methods.	The students set out to prove that code cannot violate the First Amendment. The courts have ruled against web sites that published the source code.	Now that CSS protection has been cracked, Hollywood will inevitably want to ditch DVD for something more "secure."
Sony Doubles CD-R Capacity	Sony has released a new technology that promises to double the capacity of CD-R and CD-RW discs.	Using "DD-R" and "DD-RW" discs, Sony's new CRS200E IDE drive will write about 1.3GB of data at 12x speeds.	Sony believes the technology will fill the gap between recordable DVD and CD-RW.	Here begins another standards war: Sony's discs can't be read by most CD-ROM drives, and TDK is priming a similar though higher-capacity format.

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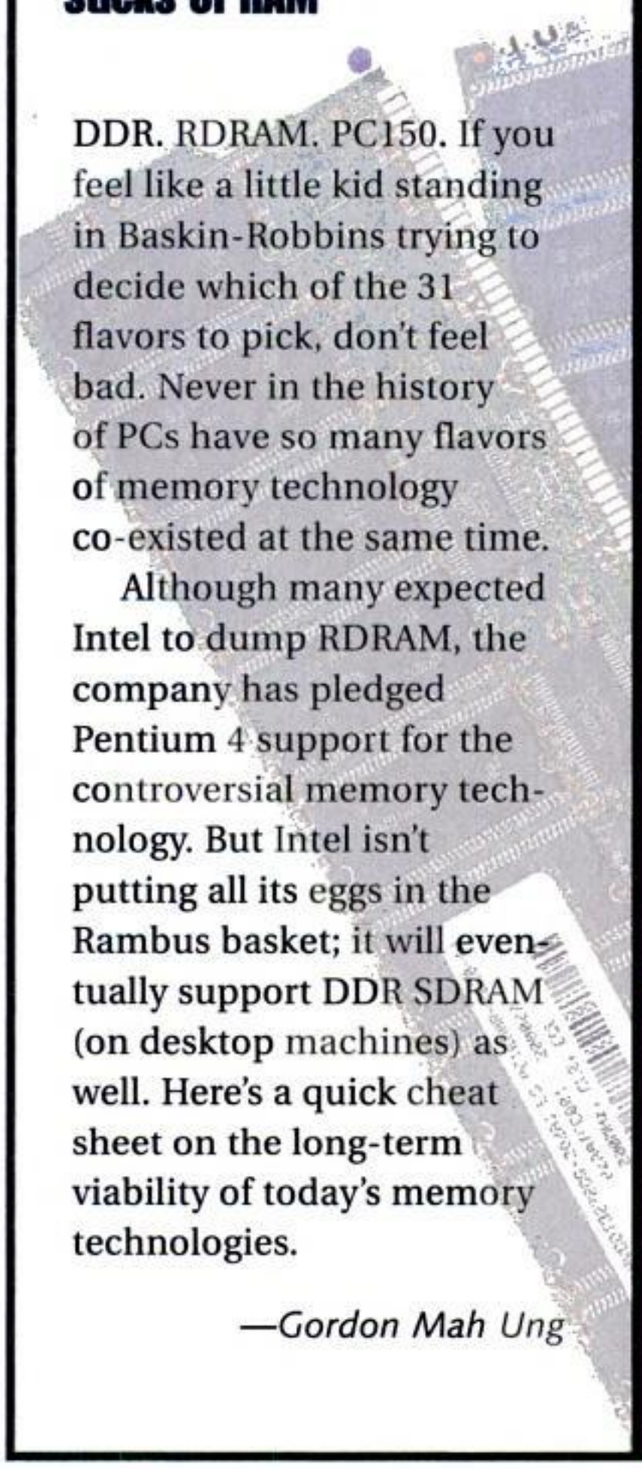
Let's Buy Some Memory!

Our definitive guide to investing in the right sticks of RAM



DDR. RDRAM. PC150. If you feel like a little kid standing in Baskin-Robbins trying to decide which of the 31 flavors to pick, don't feel bad. Never in the history of PCs have so many flavors of memory technology co-existed at the same time.

Although many expected Intel to dump RDRAM, the company has pledged Pentium 4 support for the controversial memory technology. But Intel isn't putting all its eggs in the Rambus basket; it will eventually support DDR SDRAM (on desktop machines) as well. Here's a quick cheat sheet on the long-term viability of today's memory technologies.

—Gordon Mah Ung

	WHAT IS IT?	IS IT SAFE TO BUY?
PC133 SDRAM	This is regular-old SDRAM that runs at 133MHz. PC133 is such a cheap, commonplace, backward-compatible commodity, it often appears in PCs running 100MHz buses.	Yes—if you have an old-school machine and intend to keep it in this age of DDR and RDRAM. In the bigger picture, the PC industry will continue to ship new PCs with PC133 support for at least another two years.
PC100 SDRAM	Introduced with the 100MHz system bus in 1998, PC100 was the de facto standard until the advent of PC133, then Rambus and DDR memory.	No. The slightly faster PC133 has superceded PC100 in most desktop machines. Plus, PC133 is backward-compatible, so it is "future-proof" in the SDRAM scheme of things.
DDR PC2100	Double Data Rate PC2100 doubles the available bandwidth of PC133 SDRAM to 266MHz (that's 133MHz on each edge of every clock cycle).	Yes. DDR is here to stay. Early chipset bugs aside, the memory is cheap and plentiful, and many new motherboards support it.
DDR PC1600	Double Data Rate PC1600 doubles the available bandwidth of PC100 SDRAM to 200MHz.	No. You'd be better off buying the faster PC2100 memory. It costs about the same as PC1600 and is backward-compatible with slower DDR system buses.
PC150 SDRAM	Take a standard PC133 module and populate it with Kingmax's Tiny BGA (ball grid array) chips, and you get a module that will clock up to 150MHz.	Maybe. If you're an avid overclocker and want memory that's guaranteed to run beyond spec, PC150 could be the answer. Unfortunately, under some applications, you may see better performance with CAS2 PC133 memory.
PC600 RDRAM	At 600MHz (that's 300MHz double-pumped), this is the slowest and cheapest variant of RDRAM.	No, with a qualifier. In P-III systems, the PC600 version of RDRAM is just plain slow. Same goes for P4 desktops. So you'd be better off paying for the fastest RDRAM available. However, if you have a P4 system and you're choosing between PC600 and PC700, go for PC600; it costs less and yields roughly the same results.
PC700 RDRAM	The 700MHz variant of RDRAM.	No. Unless you have an Intel 820 system, there's no point in spending extra money for PC700. And because the 850 chipset for the Pentium 4 only supports PC600 and PC800, PC700 memory gets clocked down to 600MHz.
PC800 RDRAM	The fastest version of RDRAM currently available for desktop PCs.	Yes. While RDRAM was dissed for poor performance in single-channel 820/P-III systems, the Pentium 4 redeemed some of RDRAM's rep. PC800 now stands as the fastest memory for bandwidth-intensive applications. Expect a bump in performance to PC1066 when Intel adopts a quad-pumped 133MHz bus.
VC133 SDRAM	This is PC133 memory that includes a chunk of superfast SRAM that performs caching duties for increased performance.	No. VC133 looked like it could give RDRAM a run for its money in 1999, but, unfortunately, VC133 hasn't been widely adopted and fast DDR has all but eclipsed it.

to the pertinent details.

HEADLINE	NEWS	DETAILS	THE SPIN	OUR TAKE
Congress Works to Restart Digital TV	Legislators are considering enacting stricter deadlines to put digital TV back on track.	Congress wants to force Hollywood, TV manufacturers, and cable companies to move forward without burning consumers and creating a copyright nightmare.	Congressman Billy Tauzin: "I am afraid that each industry will continue to blame the other and that the proverbial 'egg' is going to be broken."	Give 'em hell, Billy. We want our digital TV and we want it now.
SiS Ships Tualatin Chipsets	Silicon Integrated Systems says it has begun manufacturing chipsets for Intel's next-generation 0.13-micron Pentium III.	SiS's 633T offers PC133 support, while the 635T will add DDR support for the smaller, faster P-III.	SiS: "The manufacturers' challenge is to offer new products with superior performance, various add-on values, as well as price competitiveness.	Don't get too excited. It's likely the new P-III will only see the light of day in notebooks.

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Meet the Napster Gladiators

If you feel like a complete square when friends argue about who would win in a fight between Shawn Fanning and Lars Ulrich, then it's time to dig into our primer on the main combatants in the great Napster battle royale. And since the fight over digital music has "Movie of the Week" written all over it, we've taken the time to cast the main players as well.

"The Enforcer"
Hilary Rosen

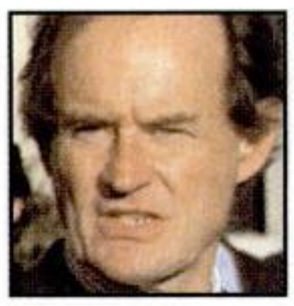
Portrayed by
Rosie O'Donnell

Chief executive of the Recording Industry Association of America (RIAA), Rosen is the main spokeswoman for the record labels, otherwise known as the enforcer for The Man.

"The Puppet Master"
David Geffen

Portrayed by
Tony Danza

David Geffen has led a holy crusade against MP3s since the days when they were traded on underground web sites and Usenet. He doesn't have a public role in the Napster suit, but we imagine he's pulling the strings from behind the scenes like a Corleone.



"The Shark"
David Boies

Portrayed by
James Gregory

This lawyer extraordinaire made Bill Gates look like a sweaty used-car salesman during the anti-trust trial between the U.S. government and Microsoft. With a penchant for taking on the big dogs, Boies has signed on to represent Napster in the legal fight of its life.

"The Aural Avenger"
Napster the Cat

Portrayed by
Hello Kitty

Napster the Cat—or is it a friggin' owl?—has come to symbolize youthful rebellion and free music. And when we say free music, we mean really *free* music.

"The Kid"
Shawn Fanning

Portrayed by
Jason Biggs

Some say Napster-creator Fanning single-handedly started the MP3 trading revolution, freeing musicians from enslavement to the big record labels. Others say he's just a petty thief who's charmed the unwitting media.

"The Rock Star"
Lars Ulrich

Portrayed by
Michael Keaton

The drummer for Metallica wants his songs off Napster—*now*! But can Ulrich retain his heavy-metal rebel status while simultaneously working for The Man?

"Da Judge"
Chief Judge Marilyn Hall Patel

Portrayed by
Shelly Morrison

Judge Patel sided with the RIAA, ruling that Napster should be barred from trading copy-righted songs. An appeals court said her ruling was overly broad and instructed her to try again.

Can Majestic Reinvent Gaming?

When's the last time *Maximum PC* was so stoked about a new game that we actually responded to the developer's press announcement with coverage in the magazine? Uh, never. But *Majestic* is different. From what we've seen, it seems Electronic Arts and Anim-X have created a title that turns traditional gameplay upside down.

Rather than relying on a high-tech 3D engine, *Majestic* turns your real-world life into the gaming environment—and what an ultra-paranoid, conspiracy-laden environment it is. *Majestic* will contact you with phone calls, faxes, instant messages, and e-mail, offering you tips and clues and encouraging you to dig deeper into the storyline to solve the mysteries that begin popping up around you the moment you give EA your credit card number.

Players can set parameters restricting *Majestic* from, say, waking you at 2 a.m.—but it seems that receiving a frantic phone call during the wee hours would only add to the excitement. We initially feared that *Majestic* would be terribly clichéd, but it actually looks like great fun for anyone who's ever wanted to live the life of Fox Mulder. The game will cost around $10 a month, and you'll have to be at least 18 to play. Expect to see eight episodes during the first year. Each episode should take between 15 days and two months to complete. Check out **www.majestic.ea.com**.

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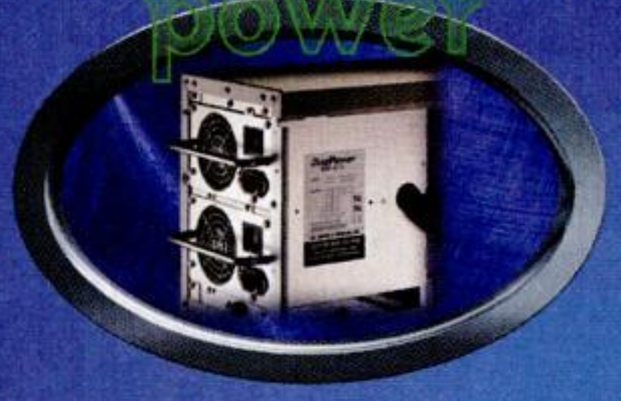

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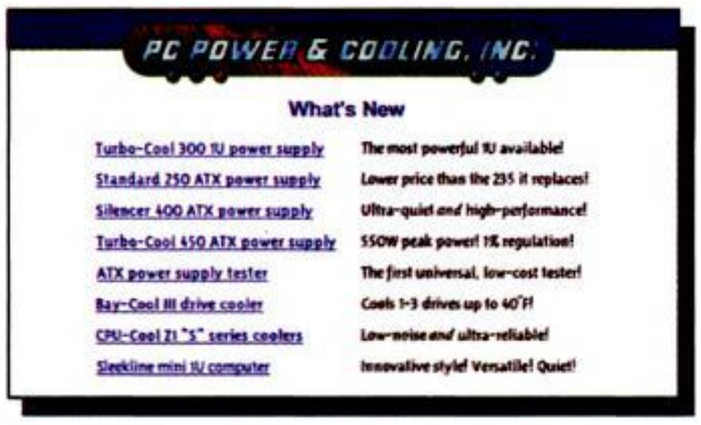
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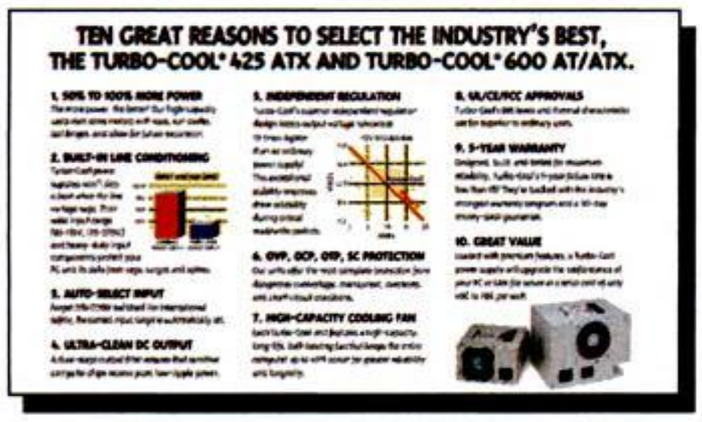
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▶ Maximum PC takes a bite out of bad service and gear

WATCHDOG

Got a bone to pick with a vendor? Been spiked by a fly-by-night operation? Sic The Dog on them by writing Watchdog @maximumpc.com. The Dog promises to get to as many letters as possible, but only has four paws to work with.

AXIS ACTUALLY AXED

The fate of missing-in-action computer vendor Axis has become much clearer. Weeks after the company stopped answering its phones, it posted this notice on its web site: "Axis Systems has had to cease operations and is currently in the process of being taken over by our lending bank, who will be liquidating our assets to satisfy our outstanding debt. In the event that there are assets remaining after liquidation by the lending bank, we expect to be filing bankruptcy with the U.S. bankruptcy court to distribute the remaining assets fairly to all remaining creditors. Thus, we are no longer able to fulfill any unshipped orders or due refunds to our customers at this time. We are also no longer able to fulfill any warranty or support obligations. We apologize for this inconvenience."

At press time, no bankruptcy filings for Axis could be located nor could The Dog reach company executives. Complaints against Axis, meanwhile, continued to flow into The Dog's in-box. Readers carped about unfilled orders and machines that might unfortunately be lost forever (you might have seen your PC for the very last time if you were unlucky enough to send it back to Axis for repair or refund).

If your credit card statement is still showing a charge from Axis for a product that never shipped, you should immediately dispute it. More news on the fate of Axis will be published here as The Dog hears of it.

RESTORE DISCS REVISITED

Bad Dog! I never write to mags, but I am now, after reading your reply to Mike Demeglio in the March 01 issue. How can you just roll over and say "Oh, well..." to the OEM practice of not including original Windows CDs with their systems? Next time you arrive at Burger King with a hungry stomach, I hope they just give you a picture of a Whopper!

The cheap companies like Packard Bell started doing this back in the early 1990s, but public outcry stopped it. Now it's starting again. If software is "included" with a system, buyers deserve to be able to hold it in their hands. Otherwise, every time your system gets a small glitch, it's "Restore—boom!—there goes all my personal data."

I think your comment about "teaching people to create restore CDs" is a cheap shot. It isn't our responsibility to create restore CDs when we've paid good money for "included" software.

Please reconsider your stance on this issue. We need you to *fight* for us consumers on this issue, not roll over. Send the word to the vendors, who can send it back to Bill Gates: People want to get what they pay for!

—Don Knieriem

"Send the word to the vendors, who can send it back to Bill Gates: People want to get what they pay for!"

Power users almost universally want the full version of Windows, and The Dog agrees.

Now, the above is just Don's opinion. Others barked back, saying that restore CDs limit one's ability to upgrade machines because the restore versions don't carry the full drivers on them and often don't work if you've upgraded.

Unfortunately, The Dog's full, nuanced opinion may have been lost in translation. The Dog has absolutely no use for restore CDs, but that position may be moot, considering the control Microsoft holds over consumer desktop operating systems. The Dog also must note for the record that many OEM machines come with Windows but don't come with a Windows CD. So it's not that you aren't getting what you paid for. Rather, you simply aren't adequately being told what you're paying for.

All that stated, careful consumers do have some recourse. For one, small vendors such as Falcon Northwest continue to offer full versions of Windows with their systems. If you want to put your money where your mouth is, pass up the big boys that only offer restore CDs and instead buy machines from specialized vendors. You can also make your displeasure known by telling the big boys why you're not buying from them.

The Dog is pushing for a new policy at *Maximum PC*—namely, to note in system and notebook reviews whether the machine comes with a restore CD or a full copy of the

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operating system on CD. The best solution would be for PC makers to offer the full version as an option for power users. Woof.

NOTHING, NATA SERVICE

Dear Dog: I purchased an Abit BE6 II motherboard, Sound Blaster Live!, and modem from Nata Computer Technologies in December 1999. The products arrived and worked fine. My problem with Nata occurred in December 2000 when a $199.25 charge from Nata appeared on my credit card. Unfortunately, I did not notice the charge for a while, and when I finally contacted my credit card company about it, they said the deadline to dispute the charge had elapsed. Nata, of course, appears to be dead. Its web page is gone and no one answers the phone. I was wondering if Watchdog could investigate the demise of Nata Computer Tech and possibly track down someone I can file suit against in small claims court.

—Jay Dub

If your store didn't buy the processor from an authorized AMD distributor, it could mean the CPU was stolen, remarked, or sold on the gray market.

The Dog Responds: The Dog contacted Nail Chakirov, the proprietor of Nata, at his Rhode Island home to ask for his explanation of the problem. Chakirov verified that Nata had gone out of business and boarded up its doors in February 2001. "I have no idea how he got charged," Chakirov said. Chakirov said the charge is odd, as Nata "didn't get any orders for a long time."

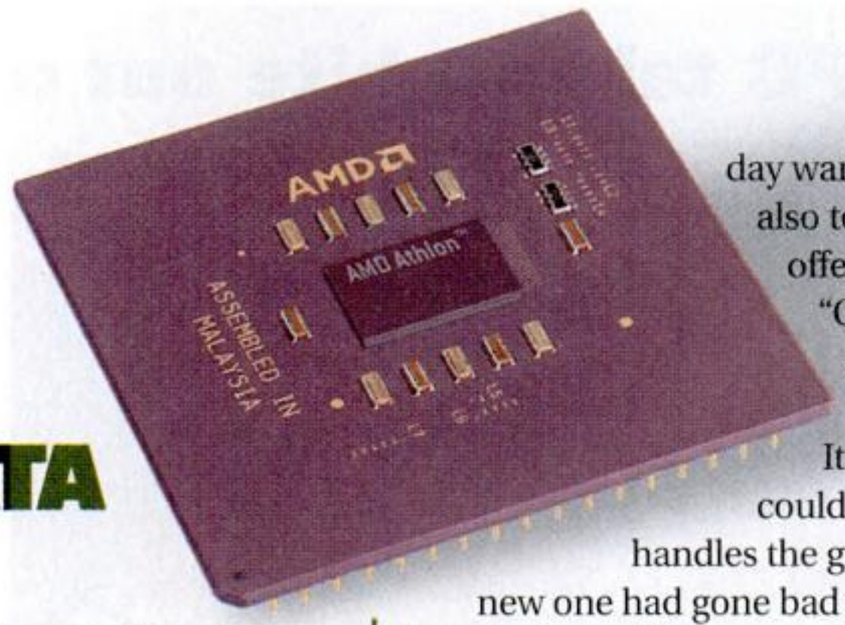
Chakirov said Nata folded because of dwindling sales and profits. Because Nata is kaput, Jay will likely be left holding the bill. A small claims action, of course, might prove to be more expensive than the actual loss. The short lesson here is to keep a close eye on your credit card statements for bad charges.

One possible solution to Jay's dilemma is for him to claim the Nata charge to be a fraudulent charge rather than a dispute. According to one credit card company, Jay's case is kind of a wobbler. If it is considered a merchant dispute, the 60-day deadline will apply. If it is indeed fraud, the deadline may be different.

The Dog is actually looking for excellent credit card companies to recommend to readers. Do you have a company that always backs you up and has a longer dispute period than 60 days? Let The Dog know at watchdog@maximumpc.com.

NO WARRANTY FOR YOU!

Dear Dog: I had a local shop upgrade my classic Athlon to a 1.2GHz Athlon Thunderbird about a month ago. All was fine until the CPU failed 33 days later. I took the machine back to the shop, but was dismayed to hear that the store where my shop bought the Thunderbird offered only a 30-day warranty on CPUs. My shop was also told that AMD isn't obliged to offer much of a warranty on bare or "OEM" CPUs. The store finally relented and agreed to swap the CPU, but I'm still disappointed. It is still my opinion that AMD could do a better job with the way it handles the guarantee on its OEM chips. If this new one had gone bad after 60 days, I would apparently have had a real fight on my hands. It doesn't seem like a good way to do business.



—Sam Cope

The Dog Responds: All savvy power users should know that "boxed" AMD CPUs carry a three-year warranty. Unfortunately, many folks still opt for "OEM" CPUs because of their alluring price breaks.

The Dog asked AMD officials to clarify their warranty on naked OEM CPUs. AMD says there actually is a one-year warranty on OEM CPUs offered through authorized distributors. In the computing world, "distributors" are the companies that sell processors to "resellers," which are usually mom-and-pop stores, PC makers, and repair shops.

AMD says Sam's CPU should be covered by warranty if it was bought from an authorized distributor. There are only five authorized AMD distributors: Avnet, Bell Micro, D&H, Tech Data, and Ingram Micro. If a store tells you that a CPU carries just a 30-day warranty, you should begin hearing alarm bells. If Sam's store didn't buy the processor from an authorized AMD distributor, the processor might have a checkered history—it could have been stolen, remarked, or sold on the gray market.

Message to readers: If you have a dud OEM processor, you should return it to the store where you bought it, and that store should return it to the distributor. If your store bought the CPU from an authorized distributor but still refuses to honor the warranty, you can contact AMD's technical service center at 408.749.2639 for assistance (assuming that you didn't violate the warranty by overclocking the processor or mistreating it). AMD will put you in touch with a field sales unit that will try to help you.

Sam's tale of woe once again highlights the risks of buying OEM or bare components. If you want the loving warmth of a warranty blanket, buy a boxed retail part.

GOVERNMENT ENFORCES WINDOWS UPDATE

If you were dismayed that Sharp never offered an upgrade for some of its Mobilon Windows CE units, the Federal Trade Commission has some good news. Sharp has agreed to honor an FTC consent decree and will offer OS upgrades for a limited time. The FTC charged that Sharp misled consumers when it said it would offer upgrades for the Mobilon 4100, 4500, and 4600 handheld PCs. Sharp will offer people who own the units a Callisto handheld PC upgrade kit, which will bring the handhelds up to Windows CE v. 2.11. Sharp will charge consumers $10 shipping and handling for the upgrade.

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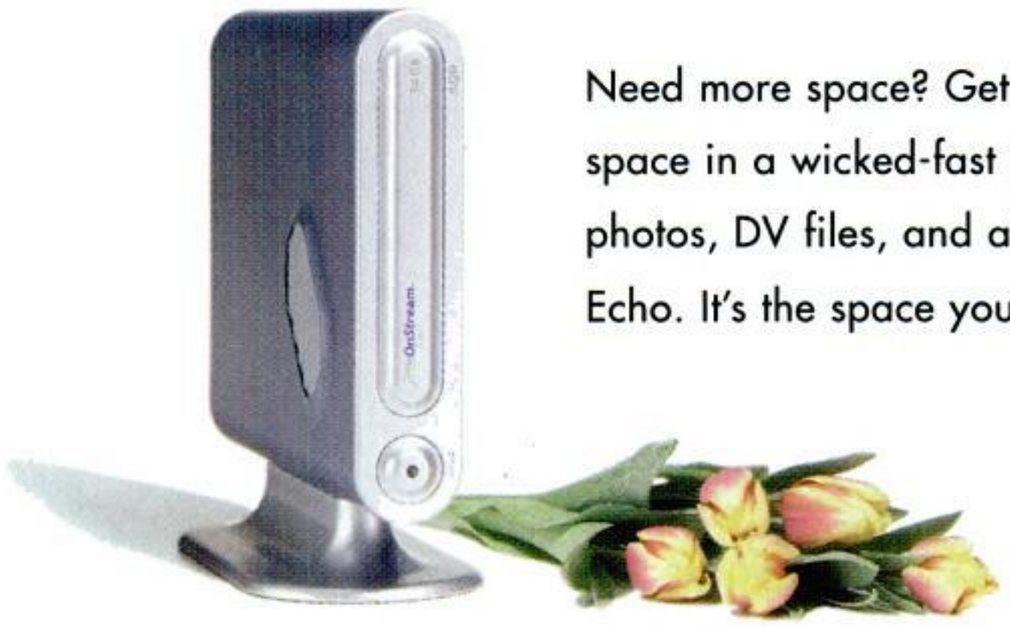

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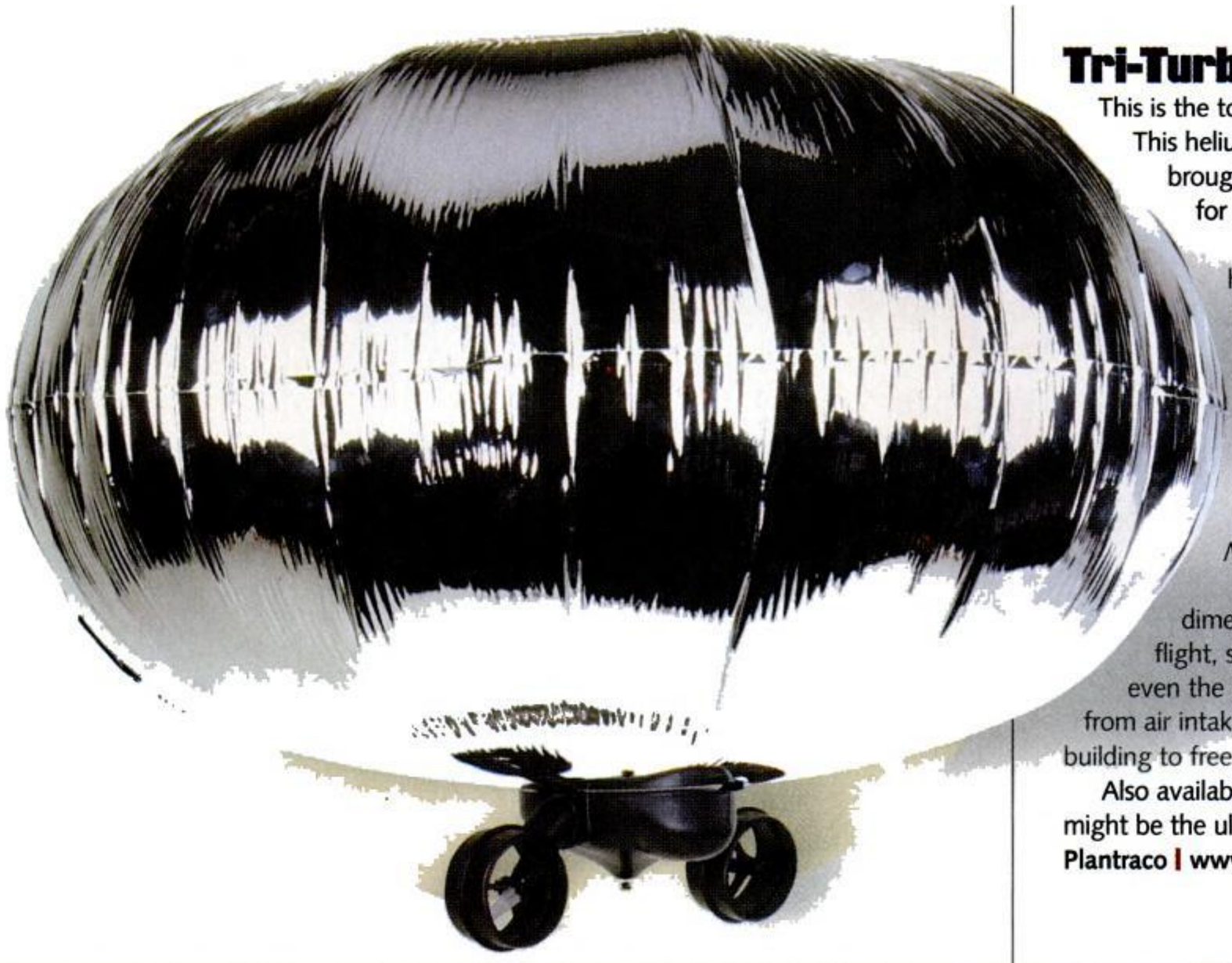

Tri-Turbofan Flying Saucer

This is the toy we've been waiting on for a very long time. This helium-filled, remote-controlled flying saucer has brought so much joy into our small lives that it's hard for us to remember those bleak days before it.

After you've filled your flying saucer with helium, set up some ballast to keep it from flying into the wild blue yonder, and loaded up the batteries, you're ready to terrorize your family, pets, and co-workers with perilously close fly-overs. We have gotten endless entertainment by attaching messages to the saucer, cranking up "Ride of the Valkyries," and doing a quick fly-by of the *MacAddict* and *PC Gamer* work areas.

While the saucer is capable of flight in all three dimensions, Plantraco only recommends indoor flight, since the Saucer is completely at the mercy of even the puniest breeze. Users should also keep far away from air intakes, as we had to turn off the A/C in an entire building to free the saucer once Gordon got it stuck.

Also available in blimp form, the Tri-Turbofan Flying Saucer might be the ultimate geek toy.

Plantraco | www.plantraco.com | 306.955.1836 | $80

sUrface 1030 Mousepad

The search for the perfect gaming mousepad has resulted in many hours playing *Quake*, and has also created a rift between proponents of the 3M Precise Mousing Surface and fans of the Everglide mousepad, with a small, contrary contingent preferring the Ratpadz. The main difference is resistance—the PMS' micro-groove surface provides lots, while the Everglide's cutting-board like surface provides almost none.

Enter the sUrface 1030. Its bright purple surface has two faces, one that provides a little less resistance than a PMS and one that provides a little more than the Everglide. Add in its perfect size (10 x 8.5 inches), the funky orange and purple styling, and the mouse cord holder, and you've got one high-tech mousepad.

fUnc Industries | www.func.net | 800.980.9997 | $20

trackIR

From the truly-weird-and-bizarre department comes the NaturalPoint trackIR, a little USB gadget that sits on top of your PC and moves the cursor to follow your head motion. While it's a terrific idea, we found it to be of limited use for people who don't have problems using normal mice or trackballs.

The main problem with the trackIR is that you have to glue a funny-looking silver dot to your face. Although the NaturalPoint rep claimed to have a bunch of people playing games with the trackIR in a local cybercafe, we find that pretty hard to believe. Anyone capable of using a mouse is probably better served by... using a mouse.

However, the trackIR could be very useful for someone who has limited motion in his or her extremities. The included accessories—a small ring for pointing and an active, keychain-sized IR transmitter—would also be useful for presentations on massive screens.

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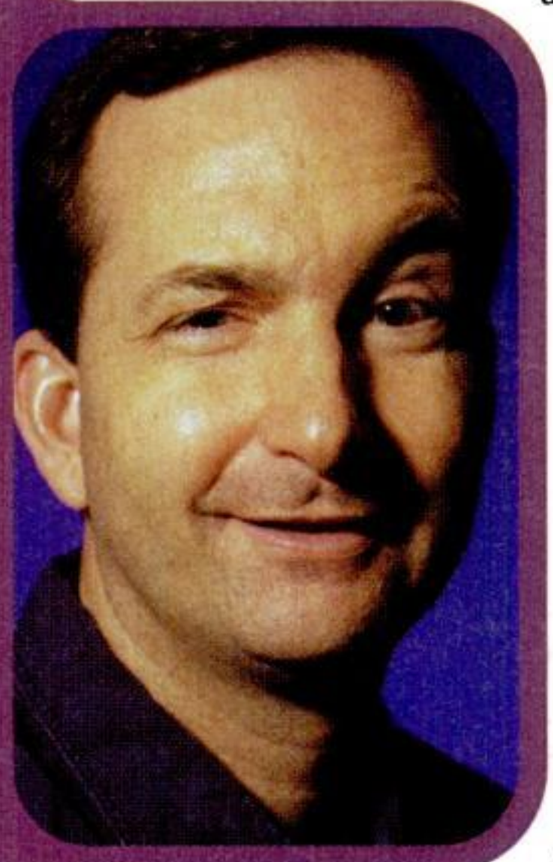

TOM HALFHILL
was senior editor at *Byte* magazine and is regarded as one of the most knowledgeable experts on processor technology in the industry. Contact him at **thalfhill@maximumpc.com**.

Hacking with Spare Parts

BUILD YOUR OWN FRANKENSTEIN BOX FOR FUN, PROFIT, AND ZANY EXPERIMENTATION

If you've upgraded your PC a few times, you've probably got a pile of spare parts laying around: old hard drives, videocards, maybe even a motherboard and a CPU. Why waste them? With a little ingenuity, you can probably use them to assemble a working computer.

Of course, a computer built out of old parts won't be a fat monster machine. It'll be a quirky box cobbled together from mismatched components and probably hindered by performance bottlenecks not found in a carefully designed PC. Call it a "Frankenstein monster machine." So why would anybody want to build such a system?

▶ To keep as a backup system in case your main PC goes down.

▶ To make a hand-me-down PC for someone else in your household.

▶ To use as a test bed for beta software or alternative OSes.

▶ To install as a file or print server on a network.

▶ To learn about hardware hacking without wrecking your primary PC.

▶ To donate as a useful gift to a school, charity, or needy family.

In my case, a backup system seemed like a good idea because I work at home and depend on my PC to keep food on the table and tequila in the cupboard. One day I looked around and realized I had almost enough spare parts to build a whole system: an Asus TX97 Socket 7 motherboard, a 200MHz Pentium-MMX processor, 64MB of EDO RAM, a Sony 16x CD-ROM drive, and a Diamond Stealth 2500 PCI videocard. The Asus motherboard has built-in audio, so I didn't need a soundcard. I found a Quantum Fireball 3GB hard drive in a trash barrel; it worked perfectly after I straightened a bent connector pin. I also found a floppy drive abandoned in a parking garage—hey, I live in Silicon Valley. All I needed was a case and a power supply.

I found a Quantum Fireball 3GB hard drive in a trash barrel; it worked perfectly after I straightened a bent connector pin.

I knew that a system made from those parts wouldn't win any benchmark contests, but it would be good enough to keep me productive if my main machine went down for a while. So I went to the store and bought a cheapo ATX case and power supply for $50. I also picked up a refurbished internal IDE Zip drive for $40 so I could transfer large files from my main PC.

I had never actually built a PC from scratch before. I always have my custom PCs assembled by a local shop that charges so little for labor that it's not worth my time to hassle with cables and jumpers. On this day, however, I decided to build the PC myself. How hard could it be?

It took me two hours to put the whole thing together. My heart thumped with anticipation as I flipped on the power switch for the triumphant first bootup.

Nothing happened. The cheapo power supply was D.O.A.

The store didn't have a replacement, naturally, so I had to take the whole computer apart, buy a different case and power supply, and put it all back together again. (That's what I get for not following the advice of the experts who review cases and power supplies for this magazine.) Now the machine powered up, but wouldn't boot properly. I spent hours fiddling with BIOS settings before I discovered the problem, a defective IDE cable. This is what I get for not following the advice of my former *Byte* magazine colleague, Jerry Pournelle: Always check the cables first.

Finally I got the machine booted and installed Windows. But the PC gods were against me. The Windows installer repeatedly crashed before finishing the job. Crucial files required for dial-up networking and DSL were missing. I solved that problem by using the Zip drives to copy the missing files from my main PC to the scratch-built PC. Then I installed my most vital applications.

To my surprise, this junkbox computer doesn't seem much slower for everyday tasks than my 600MHz Pentium III system. Really, it ain't bad. And I learned some things about diagnosing hardware problems, so overall it was a worthwhile exercise.

You can play Dr. Frankenstein too. It's fun to see a patchwork PC rise from the grave of old parts. Just remember to double-check those cables.

Random Thoughts

▶ If you can't find manuals and device-driver disks for old components, check the vendors' web sites. You can also plea for help in Internet newsgroups.

▶ A tower case with a removable motherboard tray makes building a system from scratch much easier. Avoid cases with strange pop-off plastic panels—the little plastic lugs tend to break off.

▶ You can find valuable information about overclocking, home networking, and other hardware-hacking subjects at **www.maximumpc.com**. The Terminator section helps you decipher all those strange acronyms in motherboard manuals. ✹

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CLASH OF THE GAMING TITANS

WE PIT THREE MONSTER GAMING MACHINES AGAINST EACH OTHER IN THE ULTIMATE SHOWDOWN

BY GORDON MAH UNG AND WILL SMITH

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Want to turn heads at LAN parties? Run the latest games at eye-blistering speeds? Laugh gleefully as tears of envy roll down your competition's face? Only a few elite system vendors build mega-boxes that are expressly designed to fulfill your gaming desires. If you're a member of the gaming elite, you simply cannot live without one—or can you?

What's the difference between a "gaming PC" that costs four thousand dollars and an equally powerful (but somewhat cheaper) machine from Dell or Compaq? We called the vendors that build high-end gaming boxes and requested their best creations. We asked them to send us systems equipped with components they felt gamers would appreciate (and could purchase off the shelf as of press time), which would be judged on performance and bang for the buck. Oh, and the systems had to be sitting on our doorstep within 10 days.

While we waited for the UPS truck to arrive, we pondered the need for specialized gaming machines. In the computing dark ages (circa 1997), there were sundry manufacturers for every type of hardware, from videocard chipsets to soundcards. The big OEMs stuffed their systems with lame components that left would-be gamers electronically paralyzed. Sure, that new Packard-Bell would process words and help you aboard the "Infobahn," but if you wanted to play 3D games with any degree of satisfaction, you'd have to upgrade the videocard, soundcard, and memory. Thus grew the specialty market.

Smaller vendors such as Falcon Northwest and Alienware carved a niche, building high-end gaming rigs and selling them online directly to gamers. Even NEC caught on to the trend and began pimping the PowerPlayer, an expensive rig that included a great software bundle, a trio of game controllers, and a Voodoo Graphics videocard (when all the other large OEMs were still pushing crappy S3 Virge chips that couldn't render a texture if they had a gun pointed at their heads).

Fast-forward to 2001. High-end videocards from nVidia are available in all the major OEM systems. So why pay a premium for a machine expressly designed for gaming? We asked the Gaming Titans to show us why.

Alienware, Falcon Northwest, Voodoo, and Hypersonic all committed to sending us systems (Wallop was also invited, but was in the midst of overhauling its entire product line). When the deadline passed, systems from Voodoo, Falcon, and Alienware were all humming away in the Lab, but the Hypersonic was nowhere to be seen. Hypersonic wouldn't comment on its reasons for backing out.

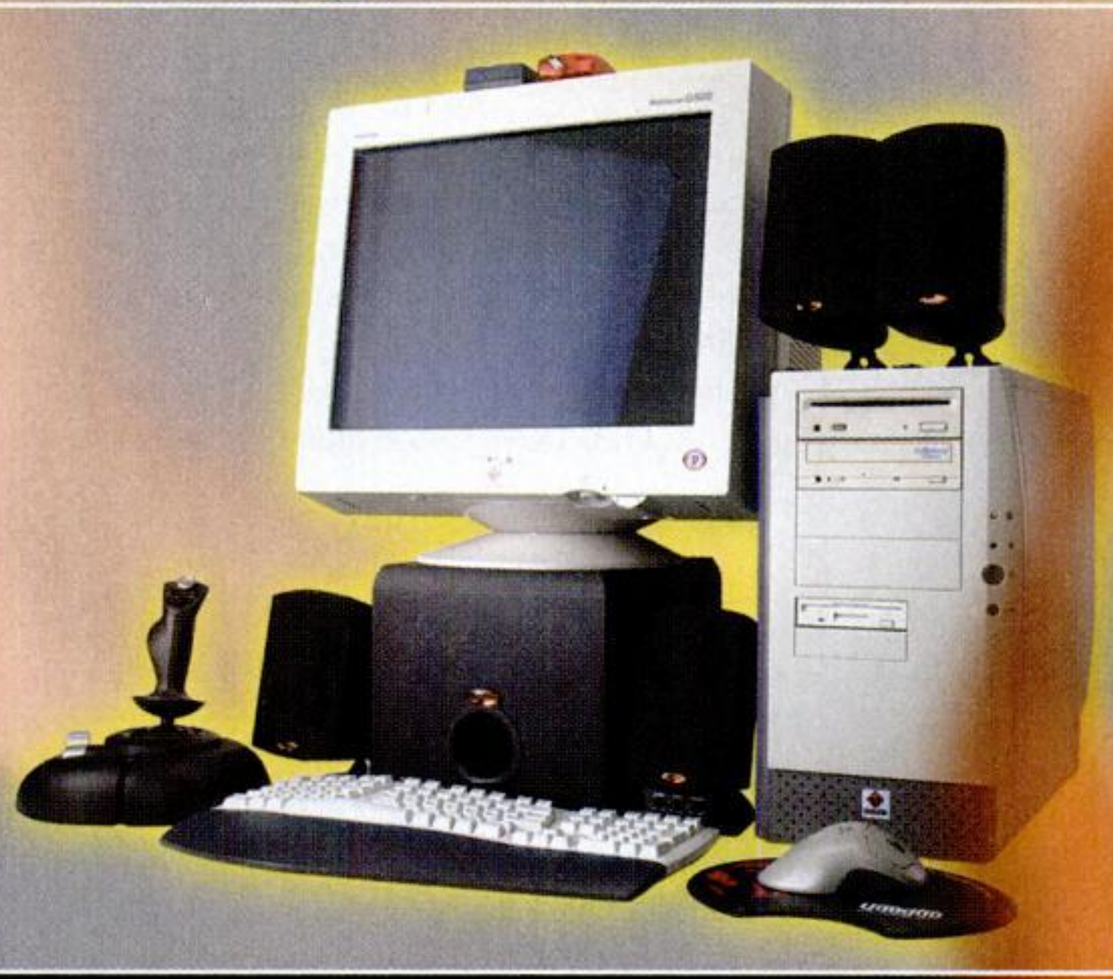
We put the three machines through a series of gaming torture tests, and we found that the difference between these gaming boxes and "normal" OEM systems isn't necessarily in performance, but in service. All three companies offer users hardware upgrade programs—something quite foreign to the major OEMs—and personalized configuration advice. After running these machines through the wringer, we named the Ultimate Gaming Titan. Read on to see which machine is the champion!

ALIENWARE AURORA DDR

There's a whole lotta green in the Aurora DDR system, but is it just another pretty face?

FALCON MACH V

Will the MACH V live up to its name and speed past the competition?



VOODOO MONSOON EGAD-DDR/1333

The Monsoon has all the best hardware, but will it be enough to give it the edge in our showdown?

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CPU

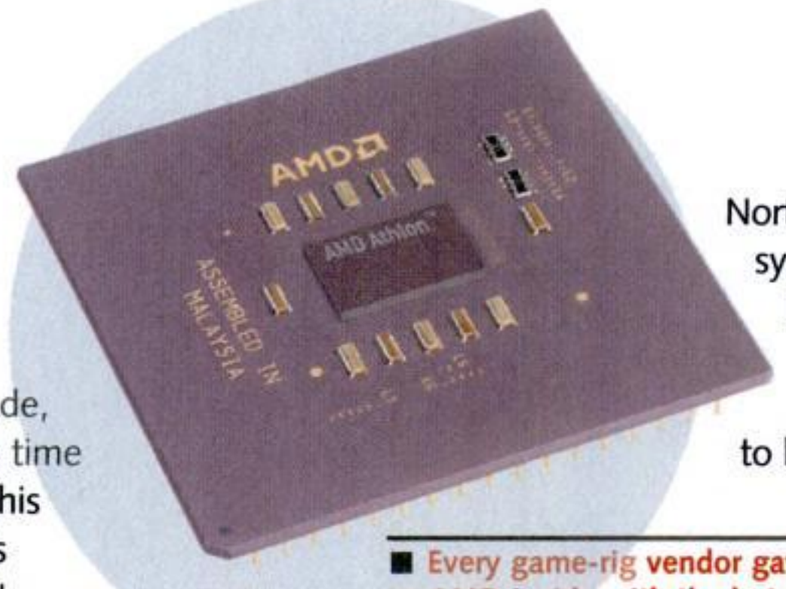
Winner: Three-way tie

When we put out the call for the fastest gaming rigs, we expected at least a few of the boxes to have Intel inside. But, once again showing its penchant for peeing on Intel's parade, AMD introduced its new 1.3GHz Athlon just in time to be adopted by the vendors participating in this battle royale. That's right: Every machine in this showdown features the same Athlon clocked at essentially the same speed.

Is the new T-bird Athlon the fastest gaming proc on the block? No. At 1.3GHz, it whups the 1.5GHz Pentium 4 in most office-productivity apps, but when it comes to gaming, the Intel silicon has the edge. The Pentium 4 triumphs in the all-important *Quake III* benchmark, as well as the *3DMark2000* 3D-gaming benchmark.

So why would Alienware, Falcon Northwest, and Voodoo build their primo gaming boxes around the Athlon if the Pentium 4 is faster in most game benchmarks? We asked the companies to send us their best efforts, not to defend their configuration decisions—but we'll acknowledge that the Rambus memory required in P4-based systems is expensive, and it's entirely possible that the vendors went with Athlons to keep sticker prices under control. Memory pricing aside, P4 procs are still more expensive than Athlon procs, and P4 systems require special cases and ATX12V power supplies.

We're declaring a three-way tie in this battle. But rest assured, anyone who buys a 1.3GHz Athlon gaming box can go to bed at night knowing he or she is owner of the fastest AMD silicon around.



■ Every game-rig vendor gave us AMD inside with the hot new 1.33GHz Athlon Thunderbird.

Videocard

Winner: Falcon Northwest

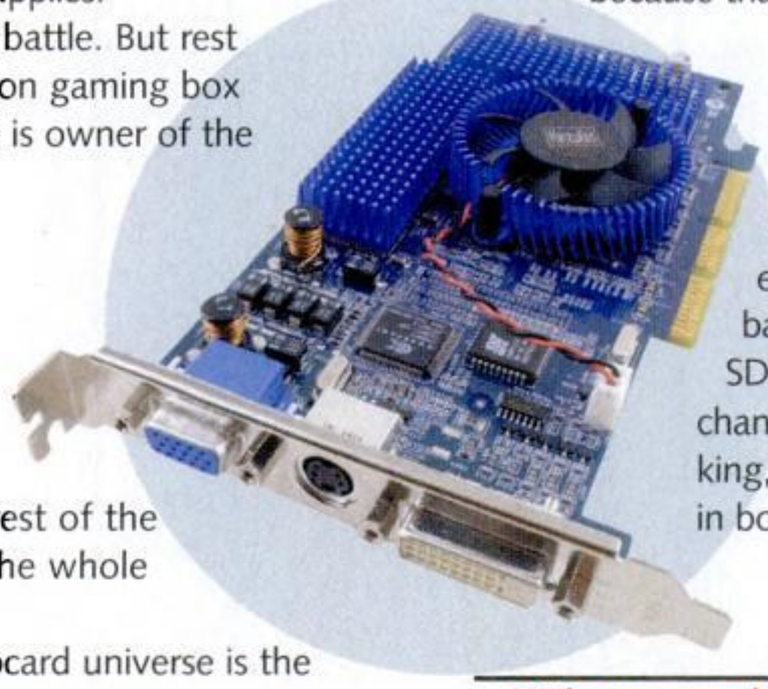
Without a doubt, the videocard makes or breaks a gaming system. Even if the rest of the rig shines, a sub-par videocard renders the whole box unworthy.

Right now, the loftiest star in the videocard universe is the GeForce3 (see our April 01 cover story). Offering the first truly revolutionary advancements in 3D graphics since 3dfx introduced the Voodoo graphics chipset, the GeForce3 is the smartest videocard choice for gamers right now.

It should come as no surprise, then, that all three vendors scrambled to get rarer-than-East-African-rhino GeForce3s in their systems. In fact, we suspect another company slated to participate in this story (*cough* Hypersonic *cough*) bailed at the last minute because it didn't have the juice to get a GeForce3. While Alienware shipped its box with a Leadtek GeForce3 at the default clock speed, Voodoo and Falcon Northwest each shipped machines with overclocked Hercules 3D Prophet 3s.

Yes, you read correctly. *Overclocked*. Why would vendors overclock the fastest 3D accelerator ever? Because they can. The Voodoo system's card was overclocked to 205 core/490 memory, and the Falcon's was cranked all the way up to 219 core/483 memory—which paid off, because the Falcon Northwest system outperformed the other systems in every single videocard benchmark. Its best *Quake III* Quaver score was a blistering 97.1fps at 1280x1024. The performance bump was small, but it was enough to hand Falcon Northwest the prize in the videocard category.

So if you buy a Falcon Northwest or Voodoo machine, might it be overclocked as well? Yes. Overclocking is part of these companies' consumer programs. Alienware has a "no overclocking" policy, which we respect but don't necessarily agree with. Video chipsets, like CPUs, have a certain amount of frequency tolerance, and overclocking is often a harmless practice that yields great rewards. Indeed, you'll most often upgrade your hardware long before any stress on the silicon can rear its ugly head.



■ With programmable shader support, the Hercules GeForce3 is a card suited for a gaming titan.

Memory

Winner: Three-way-tie

DDR anyone? We hope this is your favorite flavor of memory, because that's all you'll find here.

Technical problems, including bugs in early DDR motherboards, made for a rough start for DDR. But recently, this memory newcomer has enjoyed greater acceptance. Is DDR's double data rate technology really all that? Well, a PC2100 DDR-enabled Athlon does offer about 25 percent more bandwidth than an Athlon equipped with PC133 SDRAM memory. But the Pentium 4, with its dual-channel RDRAM memory bus, is still the bandwidth king, mowing down even PC2100 DDR memory in both synthetic and real-world benchmarks.

So why on earth did all our vendors go with DDR? Da performance and da cost. DDR offers serious power gains when compared to its non-double-data-rate predecessors (i.e., PC133). And we've found 256MB of PC2100 DDR online for as little as $100. When you compare that to the $350 it costs for 256MB of Intel-loving RDRAM, you can see why all three vendors in this roundup opted for the best Athlon memory over the best Pentium 4 memory—even if RDRAM is the bandwidth king.

All machines in this showdown were equipped with 256MB of PC2100 DDR, so the memory battle is a draw.

■ Rambus' worst nightmare: DDR SDRAM memory is here and it's cheap.

Case

Winner: Falcon Northwest

What better way to show your devotion to your wondrous machine than through attention to your case? The subdued, industrial look of the Falcon system appeals to our sophisticated side, while Alienware's Gatorade-green skin wins over our wackier side. The Voodoo's interior paint job isn't too shabby, either.

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SPOTLIGHT: VOODOO MONSOON

Phat Fan: The Super Orb heatsink has a second fan for redundancy.
Anal-Retentive Wiring: Voodoo's claim to fame is wiring, and this rig doesn't disappoint.
Second Chipset's a Charm: After much delay, AMD's DDR-loving 760 chipset arrived to support the new breed of faster Athlons.
Striped for Your Pleasure: Yup, these are three 60GB hard drives in a RAID 0 config.

Compared to the other PCs, the outside of the Voodoo machine looks as straight-laced and fresh-faced as a high-school cheerleader. But once you crack open the case, this rig is a wicked delight. The fellas at Voodoo lead the way when it comes to interior work. The entire chassis has been painted a glossy, stop-sign red. Sizzlin'! And peeking inside the Voodoo is like looking into the engine bay of a show car—we're beginning to think that Voodoo is directly responsible for the industry-wide move to pay more attention to internal wiring. The wiring job in this rig is a testimony to fine detailing.

In terms of hardware, the Voodoo is strictly top-of-the-line and plays host to the fastest AMD Thunderbird available, a 1.333GHz CPU clocked to 1,350MHz. It's also got a Hercules 3D Prophet III, the only videocard that deserves to serve with a processor this fast. And the company shows cojones by including three 60GB Deskstars in a RAID configuration. Top-notch IDE optical drives complete the package, along with a stunning Sony G500 monitor and Hercules Game Theater XP soundcard.

For fun, we suggest that you leave the Voodoo buttoned up so your friends think it's a plain-jane Athlon box. Then open her up and watch their jaws drop.

$6,183 | www.voodoopc.com | 888.708.6636

SPECS

CPU	AMD 1.35GHz Thunderbird
RAM	256MB PC2100 DDR SDRAM
Mobo	Asus A7M266
Graphics	Hercules 3D Prophet III 64MB
Sound	Hercules Game Theater XP, Klipsch v.4-200
Optical storage	Pioneer DVD-105, Plextor 16/10/40a
Magnetic storage	Three IBM 60GB 75GXPs (RAID 0), Promise FastTrack 100
Networking	D-Link DFE-538TX 10/100 NIC

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Of course, there's more to consider than visual appeal. Expansion options, cooling, and sound-proofing are also essential. We applaud Voodoo's excellent expansion abilities, but feel the case needs additional cooling up front. The large-diameter 120mm fan over the expansion slots and top blow-hole are well-placed, but we think a RAID hard-drive array demands an active-cooling solution.

Between the two other machines, Alienware gets the nod for expansion opportunities, with four 5.25-inch bays to the Falcon's three. But Falcon Northwest bests Alienware on the cooling front, with two front-bezel-mounted fans, a top blow-hole, and an aluminum case that actually wicks heat away.

■ Falcon's Cooler Master wowed us when we first saw it last year, and it still gives us a warm, fuzzy feeling.

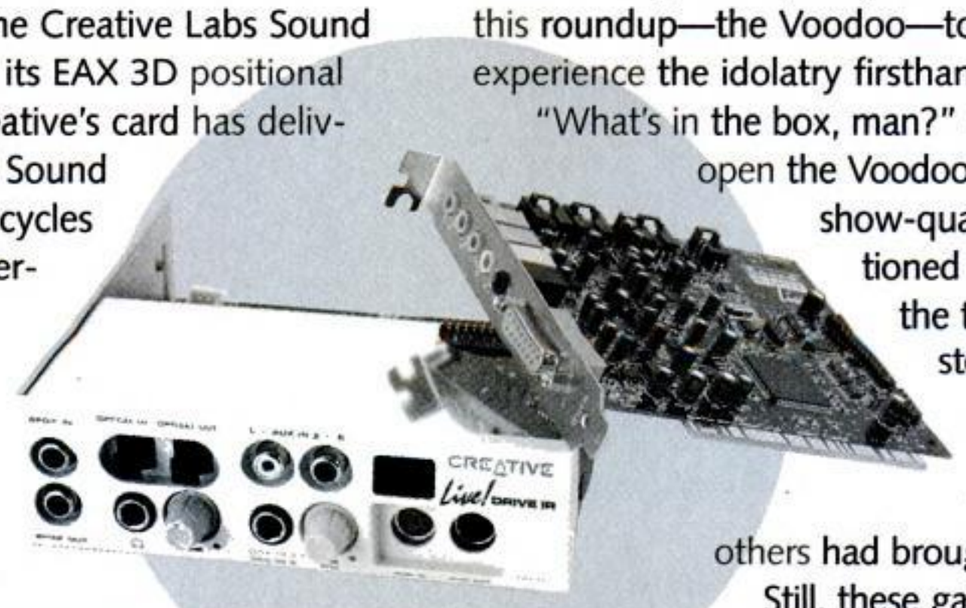
All three machines generated equal amounts of noise, which in every case was louder than standard Dell, Compaq, and HP PCs. That aside, Falcon takes the prize for its case—we liked its looks, but the clincher was its cooling.

Soundcard

Winner: Alienware

Though hardcore gamers sometimes dis the Creative Labs Sound Blaster Live! for the heavy-handedness of its EAX 3D positional sound effects, there's no denying that Creative's card has delivered what matters most: frame rates. The Sound Blaster Live!'s solid drivers don't sap CPU cycles and generally help their host systems generate the fastest frame rates possible.

We saw two iterations of the Live! in this battle. Falcon Northwest's machine uses the XGamer 5.1, which offers basic soundcard functionality. Alienware one-ups Falcon by going with the Platinum 5.1 version, which uses the same actual soundcard as the XGamer 5.1, but also includes the Live! Drive II IR. This breakout box mounts in the front of the computer case (like, say, a CD-ROM drive) and includes all types of inputs and outputs for your multimedia production and home-theater needs.



■ Alienware's Sound Blaster Live! Platinum gets the nod for offering more frame rates than the competition.

Voodoo threw us a curveball with Hercules' new Game Theater XP soundcard. We've yet to review this new card, but it looks and sounds hot. Based on the new Cirrus Logic CS4630 chip, the Game Theater XP includes a sexy, metal breakout box that features knurled aluminum knobs—along with digital, analog, and optical I/O, MIDI connectors, a four-port USB hub, and a game-controller port.

But, all this goodness aside, we did find the Game Theater XP's frame rates to be about five frames behind those of the SB Live!. So we're awarding the gold star in this battle to Alienware and its Sound Blaster Live! Platinum 5.1, but we can't wait to give the Game Theater XP a second look.

■ Klipsch's new 4.1 system offers improved mid-range support and better controls.

Speakers

Winner: Falcon Northwest

A set of crapola speakers can suck the oomph from even the most powerful gaming rig. This likely explains why all of the vendors we contacted shipped their systems with the mightiest of all gaming speakers, Klipsch ProMedia. We did see a few different versions of the Klipsch, however. Voodoo and Alienware went with the original ProMedia 4.1 system, which provides great sound but suffers from a few flaws, such as an inconvenient on/off switch and no headphone jack. Falcon hooked us up with the brand-new, redesigned version of the ProMedia (see our review on page 70), which includes an easy-to-reach power switch, a headphone jack, and improved crossover for better subwoofer performance. The original system gave us little to complain about, but the new version is even better. Kudos to Falcon.

Pricing

Winner: Falcon Northwest

Why shell out a few extra grand for a specialized gaming rig instead of getting yourself a boring-but-powerful blue-chip box? For the envy factor, baby! We brought the most expensive rig in this roundup—the Voodoo—to a *Quake III Arena* LAN party to experience the idolatry firsthand.

"What's in the box, man?" one gamer asked. As we cracked open the Voodoo to show off the exquisite wiring and show-quality paint job, we nonchalantly mentioned the 1.3GHz Athlon, the GeForce3, the three-drive RAID with 180GB of storage, and the 16x Plextor drive. A small crowd began to gather. Suddenly, no one cared about the 1GHz Pentium IIIs or Voodoo 5 cards others had brought. The alpha machine had arrived.

Still, these gaming rigs are expensive as all get-out. Even the least expensive box in this roundup is priced well above a maxed-out Dell, Compaq, or HP box. The Voodoo tips the scales in terms of features, as well as in terms of pricing, weighing in at a staggering $6,183. That's a lot of ducats to shell out, even for a PC this beautiful. Alienware's machine offers a slightly lower "wow" factor in terms of hardware, but not by much—and there's only a $4,500 price tag attached.

With no NIC, CD-ROM burner, hardware decoder, or TV-out—and a $3,500 price tag—the Falcon Northwest rig might be considered the "budget" option here. But guess what? It demonstrated the best performance of the three in our gaming benchmarks (albeit by a slight margin). In terms of pure price-to-performance ratio, the Falcon takes the cake.

Hard Drive

Winner: Voodoo

Most computers from big OEMs include just one hard drive for your

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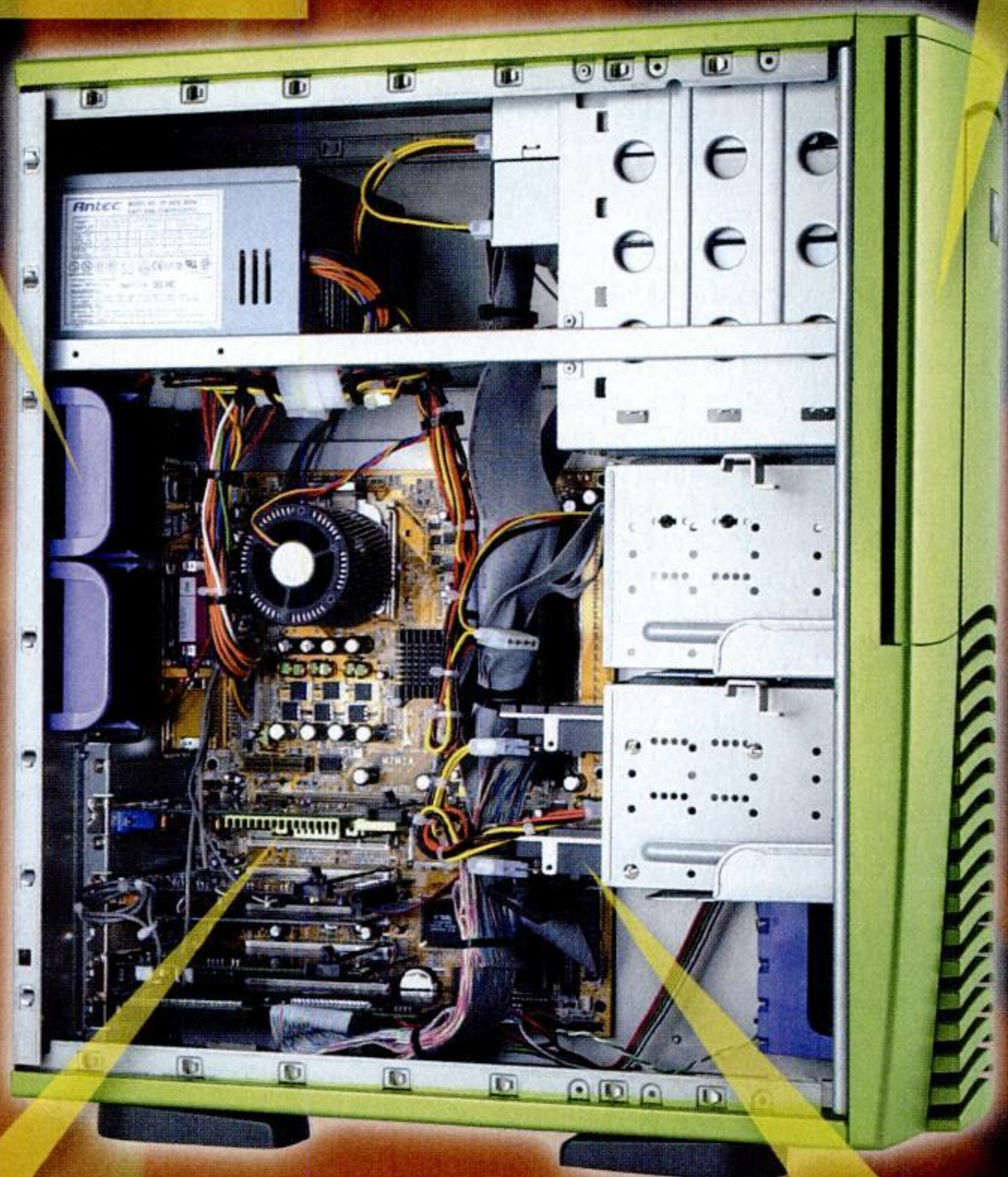
SPOTLIGHT: ALIENWARE AURORA DDR



Alienware Fan Outlet: This trick fan vents air from your oh-so-hot add-in cards and features a hypnotic Alien head. Did we mention that it features a hypnotic Alien head?

Ain't No Spray-Can Hack: Fear not—this case wasn't painted by some kid with a spray can behind the shed.

GeForce3: With Creative Labs sitting on the fence regarding GeForce3, Alienware turned to underdog Leadtek for its video hoedown.

Dual X15s: The pair of 15,000rpm Cheetahs may not be in RAID 0, but they offer damn near the performance of some IDE RAID arrays, with significantly less seek time.

What don't you get from the big PC makers? Krazee kolors! Alienware's metallic-green PC just screams "custom rig"—and so do other special features, such as the blowhole mounted over the add-in cards. The system even features a dust filter and a custom screen with the Alienware logo in it.

Inside the Alienware, you'll find standard fare—though that's like describing Arnold Schwarzenegger as an "average guy" when he's standing among a crowd of Mr. Universe winners. Armed with AMD's 1.3GHz T-bird, a Leadtek GeForce3, and a Biostar mobo with 256MB of DDR memory, the Alienware packs serious power.

Alienware throws a curve ball by eschewing the IBM/Promise RAID setup in favor of two 15,000rpm Cheetah X15 drives. While a two-drive IBM RAID combo is a bit faster and larger than a single X15, the X15s can't be beat for seek speed.

The SB Live!/Klipsch combo makes for big sound, and the machine's optical storage options nearly mirror those of the Voodoo. But the real gem of this box is its custom color. Alienware went plumb crazy and delivered a keyboard, Microsoft mouse, and monitor all painted the same eye-popping green. Even the speakers sparkle.

If you want a show-ready rig (without building your own paint room), Alienware is more than ready to abduct your money.

$4,500 | www.alienware.com | 800.494.3382

SPECS

CPU	AMD 1.33GHz Athlon
RAM	256MB PC2100 DDR SDRAM
Mobo	Biostar M7MIA
Graphics	Leadtek GeForce3
Sound	Sound Blaster Live! Platinum 5.1, Klipsch v.4-200
Optical storage	Pioneer DVD-115, Plextor 16/10/40a
Magnetic storage	Two 18GB Seagate X15 Cheetahs, Adaptec 29160
Networking	Intel Pro 100

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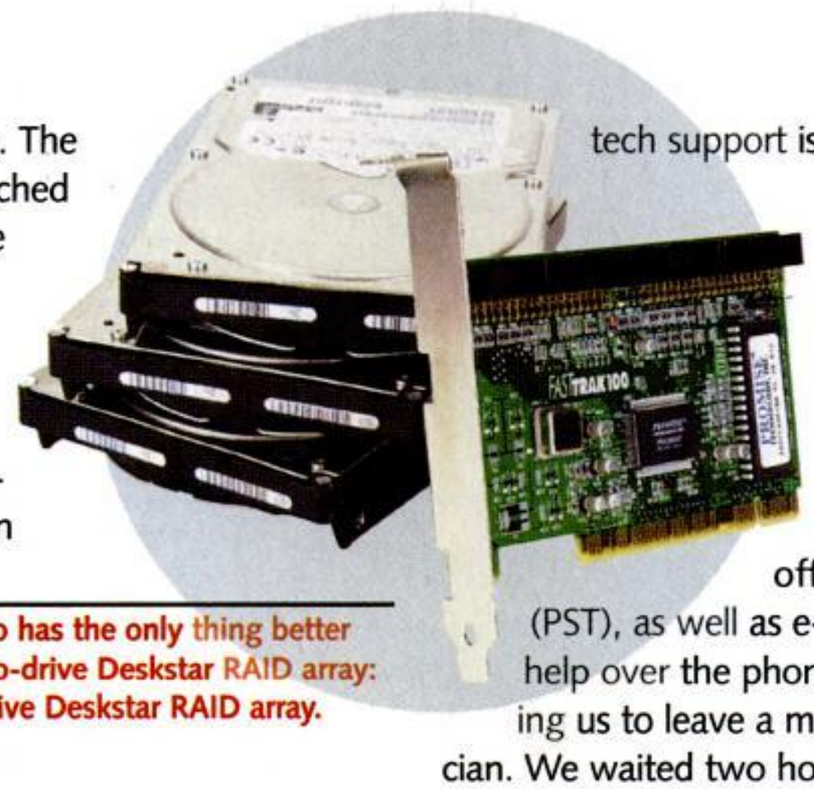
storage needs—and we think that's just bunk. The three vendors in this showdown each approached hard-disk storage in a different way, but none insulted us by presenting a puny, single-disk system. The Voodoo and Falcon machines both use IDE RAID solutions that feature striped disks attached to a Promise FastTrack controller. Voodoo, however, implemented three IBM 75GXP drives, while Falcon went with just two IBM 75GXPs. The Alienware marches to a different beat altogether, with two Cheetah X15s connected to an Adaptec 29160N SCSI controller. Can the non-RAID SCSI approach beat the three-piece IDE RAID solution? Not in this competition.



■ Voodoo has the only thing better than a two-drive Deskstar RAID array: a three-drive Deskstar RAID array.

Still, to our surprise, the three systems performed about equally in our load-time benchmarks—no specific drive strategy dramatically affected the time it took to load games and begin playing. Thus, the issue is not which machine offers the fastest hard-drive configuration, but rather which boasts the largest-capacity bucket. Some might say that "excessive" best describes the Voodoo's three 60GB 75GXPs. We say, "How could you go wrong with 180GB of storage? That's room to hold every halfway decent game made since 1993!" Score one for Voodoo in the hard-drive department.

Monitor

Winner: Voodoo

There are two types of monitors: those with Sony tubes and those without. Nearly every display in the latter category is plagued by some flaw—unsightly screen curvature, poor color brilliance, blotchy spotting, and piss-poor refresh rates, to name just a few. But Sony monitors deliver top-notch performance again and again.

Falcon Northwest and Alienware chose 19-inch shadow-mask displays from Viewsonic and Optiquest, respectively (Optiquest is the "value" arm of Viewsonic). The Canadian contingent—that would be Voodoo—put its money on the 21-inch Sony G500. Though it's not Sony's top-of-the-line display, it borrows the same flat-screen DNA from Sony's best Trinitrons and smacks the monkey's ass when compared to other tubes. With a flat, bright CRT, the G500 is a wonder to gaze upon at any resolution, so Voodoo gets another feather in its Mountie cap. After all, this is a showdown among gaming machines, and when push comes to shove, almost nothing is as important as the size and clarity of what you see onscreen.

■ Voodoo provides the best visual experience via the exquisite Sony CDP-G500 monitor.

Tech Support

Winner: Alienware

Testing tech support is a thankless task, to be sure, and not an especially easy one. Our method involved fabricating a problem—"The machine just won't boot!"—that we thought most intermediate-level computer users could troubleshoot. We then contacted each company's tech support department for assistance. In each case, we considered the breadth of available web support, the hours live tech support is available, and how knowledgeable the technicians are. That said, consider that "support testing" was hardly a scientific process. We base our opinions on anecdotal evidence.

We were less than pleased with Falcon Northwest's web-based support—the support FAQ was "being updated," and the drivers-download section provided only a smattering of utilities. The company does offer phone support from 9 a.m. to 6 p.m. (PST), as well as e-mail and fax support. Our first attempt to get help over the phone resulted in an answering machine instructing us to leave a message and expect a call back from a technician. We waited two hours and went to lunch—nada. It dawned on us later that the technician had possibly called and balked when he or she reached the voicemail of a *Maximum PC* editor—which, as it turns out, is exactly what happened. We waited a few days, tried again, and this time were able to fly in under the radar. We found the Falcon techie to be both personable and technically astute.

We were more impressed with Alienware's web support than with that offered by the other two vendors; motherboard drivers, BIOS updates, and several benchmarking applications are all available for downloading. Some of the files were a little dated when we checked, but Alienware's web site is still much more complete than those of Voodoo and Falcon Northwest. Our call to Alienware's phone support (offered 24 hours a day via a third-party service) was answered within one minute. We provided our service number and were told a technician would contact us in a few minutes. A techie did call us—40 minutes later—but said he couldn't help us with our problem unless we were sitting in front of the box (which happened to be stationed in the Lab). We called back again in hopes of reaching a different technician and modified our fake problem to "The fans turn on, but nothing comes on the video screen!" The tech quickly diagnosed the trouble as either a loose cable or loose videocard and provided surprisingly detailed instructions on how to remove the card. She even remembered to mention the AGP retention clip that some of our staff members have issues with, and offered to walk us through the process. Essentially, she rocked.

Voodoo's web site support was comparable to Falcon's, with links to manufacturers' web pages but few driver or BIOS updates hosted locally. Voodoo's phone support is open Monday through Friday from 9 a.m. to 6 p.m. and Saturday from 10 a.m. to 5 p.m. (MST). Our call was answered after just three rings, and our fake problem—"Uh, the computer monitor doesn't come on"—was handled with aplomb by the technician. After we dropped a few hints—"We just moved the machine" and "The fans come on and it beeps, but nothing shows up on the screen"—the techie had the correct answer: "Most likely, the videocard was bumped lose during the move." He gave us a few tips on grounding ourselves and making sure the power supply had fully discharged before we started working on the machine.

We think Alienware's 24/7 phone support option is too excellent to overlook. If your computer breaks during a late-night gaming session, Alienware is the only vendor here that's going to be able to help you out. Add the fact that Alienware's web site is the most

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SPOTLIGHT: FALCON NORTHWEST MACH V

Cool Indeed: The Cooler Master aluminum case is blissfully constructed.
No Cupholders, No Heated Seats: What stands out in the MACH V is its zen of hardware emptiness. There's no CD-R drive, NIC, or MPEG-2 decoder.
Antec
A7M266

New, Improved Klipsch: Falcon includes Klipsch's new-and-improved 4.1 system, with better crossover and more convenient controls.

Overclocked and Outrageous: Falcon pushes the new GeForce3 to the very edge by running it at 418MHz.

Falcon takes a minimalist approach with the MACH V gaming rig. There's no CD-R drive and no hardware MPEG-2 decoder—not even a NIC. Instead, the MACH V emphasizes videocard, processor, and storage. And the entire package is wrapped in an expensive and sexy Cooler Master ATC-200 case.

That's not to say that the MACH V is outgunned by the others here. If anything, the only two fighters in existence at press time that could match the MACH V are made by Alienware and Voodoo. That's a pretty elite group. We guess it's no surprise that, like its competition, Falcon also chose AMD's hot new 1.3GHz Athlon.

Falcon has a rep for pushing hardware to the edge, which explains why our MACH V came equipped with a GeForce3 clocked up to 418MHz and running very stable. Audio chores are left to a Creative Labs X Gamer 5.1, the same card as the Platinum, sans the Live Drive II. And Falcon managed to gank a set of Klipsch's re-tuned 4.1 speakers ahead of the competition. Storage is left to a pair of 45GB IBM Deskstars hooked up to a Promise FastTrack100 controller. There's no fancy case color, but it would be a crime to paint the all-aluminum ATC-200 case.

The MACH V is primed for one purpose and one purpose only: gaming. If you don't want the distractions of extraneous hardware, the MACH V could be your answer.

$3,495 | www.falcon-nw.com | 800.325.2661

SPECS

CPU	AMD 1.33GHz Athlon
RAM	256MB PC2100 DDR SDRAM
Mobo	Asus A7M266
Graphics	Hercules 3D Prophet III 64MB
Sound	Sound Blaster Live! X Gamer 5.1, Klipsch 4.1
Optical storage	Pioneer SD-M1502
Magnetic storage	Two IBM 45GB 75GXP (RAID 0), Promise FastTrack 100
Networking	Nada, zip, zilch

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complete of the three, and you'll see why we're giving it the thumbs-up in this battle.

Controllers

Winners: Alienware and Falcon Northwest

Like any warrior choosing his weapons, a gamer must be selective when it comes to gamepads, joysticks, and even the plain-old keyboard and mouse. This likely explains why each of the three system vendors made a point of telling us they can ship a variety of controller options, depending on the customer's request. For kicks, we asked them to use their judgment when sending in their superboxes, and were surprised when we got three entirely different controller setups.

Alienware anted up the most complete controller suite, including an Antec standard keyboard, a Microsoft Intellimouse Explorer, a Microsoft Sidewinder Force Feedback 2, and a Microsoft Sidewinder Plug and Play gamepad. We've been fans of the Force Feedback 2 for a while, but the Sidewinder Plug and Play was new to us, and we were duly impressed. While it doesn't feature an analog stick for console-type platform games, it's perfectly suited to most sports games. Alienware also gets style points for color-matching its keyboard and mouse to the rest of its system

Voodoo also included a MS Sidewinder Force Feedback 2, but bundled it with a Logitech Cordless Desktop Pro. Though the Cordless Desktop Pro is the best wireless keyboard/mouse combo out there, wireless setups as a rule can't support the kind of refresh rates that hardcore gamers are looking for (especially when it comes to playing first-person shooters, which demand intense precision).

Which brings us to Falcon Northwest. Falcon sent us a Force Feedback 2, an Intellimouse Optical, and a Microsoft Natural Keyboard Pro, complete with integrated USB hub and re-mappable Internet hotkeys. A nice assortment, all around.

All three vendors made the point that each customer should hand-pick his or her own controllers, so rest assured that if you buy one of these systems, you can call your own shots. Nonetheless, this is our battle to call, and we have strong opinions about game controllers. We feel that Voodoo should have known better than to send a cordless controller system to a gamer, so we're calling this a tie between Falcon Northwest and Alienware.

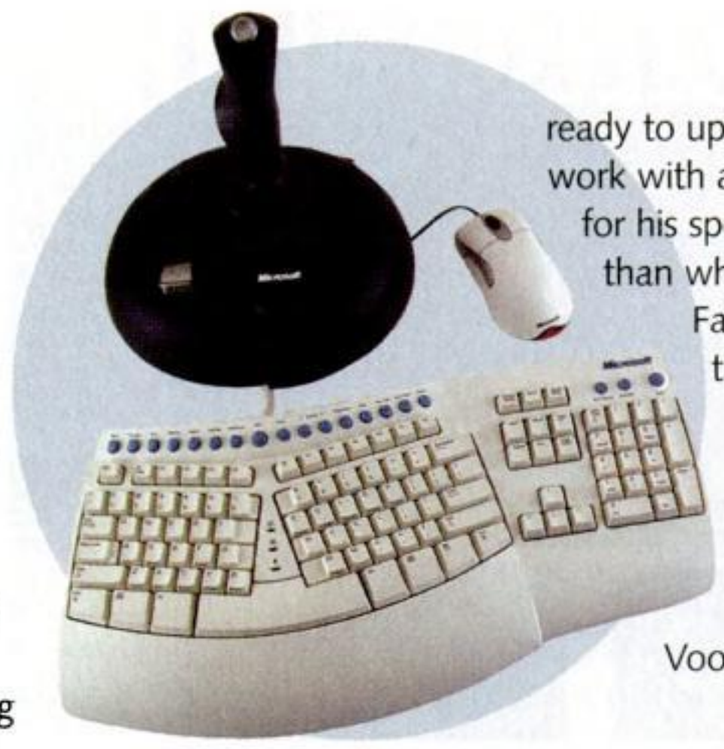
Upgrade Policy

Winner: Voodoo

The sad truth is that the effective lifetime of a gamer's machine is maybe three years, at best. Because of that, a good upgrade policy can be worth its weight in motherboards. Each of our warring vendors deals with upgrades differently.

According to Alienware's web site, the company offers customers new hardware upgrades at discounted costs—but that's all the site says. If you want details—such as finding out that you can do the installation yourself or ship the system to Alienware to have the work done—you'll have to call the company and grill them for answers. (We spoke with Frank Azor, senior vice president.)

Falcon Northwest's "total customization by the customer" policy, which applies to upgrades as well as new system configs, is also vaguely alluded to on its site—call for the total lowdown. According to Kelt Reeves, Falcon Northwest's president, when a Falcon owner is ready to upgrade, he can call his customer support rep and work with a Falcon tech to make the best upgrade choices for his specific gaming needs (at a cost slightly higher than wholesale). The gamer can ship his system to Falcon to handle the upgrade, or elect to receive the parts and do the installs himself.



■ The Falcon Northwest's bundle includes our favorite mouse, keyboard, and joystick.

Voodoo's upgrade policy is the most impressive of the three, and not just because its web site more clearly outlines it. A customer interested in upgrading presents Voodoo with an upgrade budget—say, $1,000—and a Voodoo customer support rep works with a tech to create a best-bang-for-the-buck upgrading scheme, with parts offered at "slightly better than wholesale" prices, according to Rahul Sood, Voodoo's president. The user ships the system back to the Voodoo factory, where the new hardware is installed, the OS is reinstalled, the machine is tested and tweaked to Voodoo standards, a new rescue disk is burned, and the computer is burned-in—all in just 15 days. Wowsa! Voodoo gets our nod here for sure.

Out-of-Box Experience

Winner: Alienware

Little can match the joy that floods a gamer's heart when the UPS guy shows up with a new hot-rod system. And not much can match the utter despair that courses through the gamer's veins when the so-called "dream machine" arrives in pieces because it wasn't packed properly, or when it fails on its first boot. For our purposes, out-of-box experience includes four considerations: wow factor, packaging materials, documentation and extras, and boot-up success.

Tearing into the Alienware box was an eye-opening experience indeed. Alienware customers can choose from eight different color schemes—we went with green. But as soon as we ripped open the packaging, we were immediately struck by how much...well, how much *greener* the system looks in real life than it does on the web site. And who'd have expected the monitor, speakers, keyboard, and mouse to be green, too? Not us. Alienware's packaging was more than sufficient—all the components arrived intact, and the system booted without a hitch.

Our fully intact Falcon system was accompanied by an Everglide mousepad and a T-shirt, both emblazoned with the Falcon logo. Free stuff! Wahoo! We especially dug Falcon's documentation (including the big poster showing all the major connections) and disk bundle (though it could have been better organized in some sort of binder). We'll excuse Falcon from the "does-it-actually-boot?" test, since the machine was hand-delivered by the Falcon folks and would have been instantly disqualified if the rig hadn't worked.

Merely lifting the Voodoo case from its packing box resulted in a dreadful rattling sound that gave us something of a start. We immediately investigated by opening up the case for a biopsy. After recovering from the initial shock of seeing the case's fire-engine red interior, we saw that a large fan had come loose and was floating around inside the case. Doh! After reconnecting the fan, we booted without a hitch. Voodoo does get mad props for its CD caddy/documentation holder, which was definitely the best of the bunch.

In this case, we're awarding the win to Alienware. After all, it's not easy being green.

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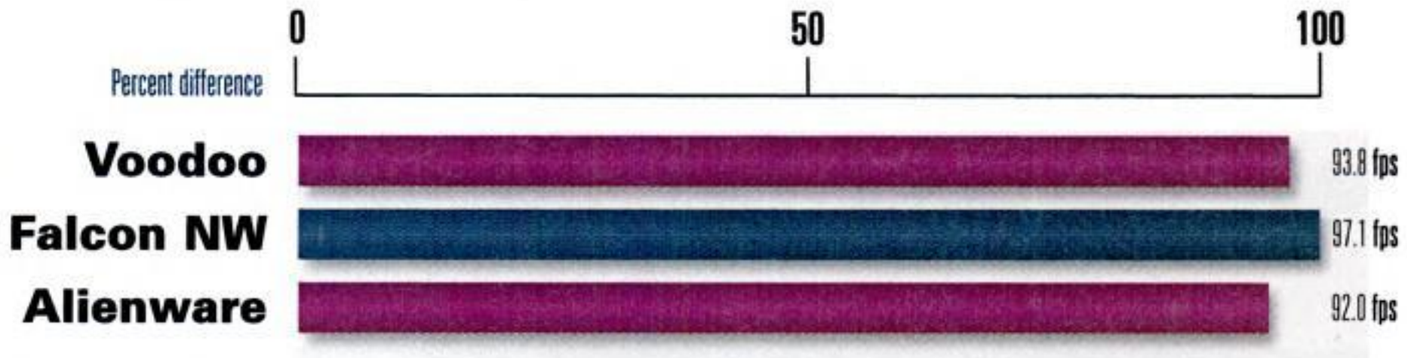
WATCH THE FALCON SOAR

Performance is what separates the manly gaming boxes from the Barbie PCs. The Falcon—with its dramatically overclocked videocard—proved to be the brawniest of the bunch. Because the Falcon won every benchmark, the scores of the other machines are represented as percentages of the Falcon's scores (actual frame rate numbers can be found to the right of each chart). All benchmarks were run with the latest 1080 videocard drivers from nVidia.

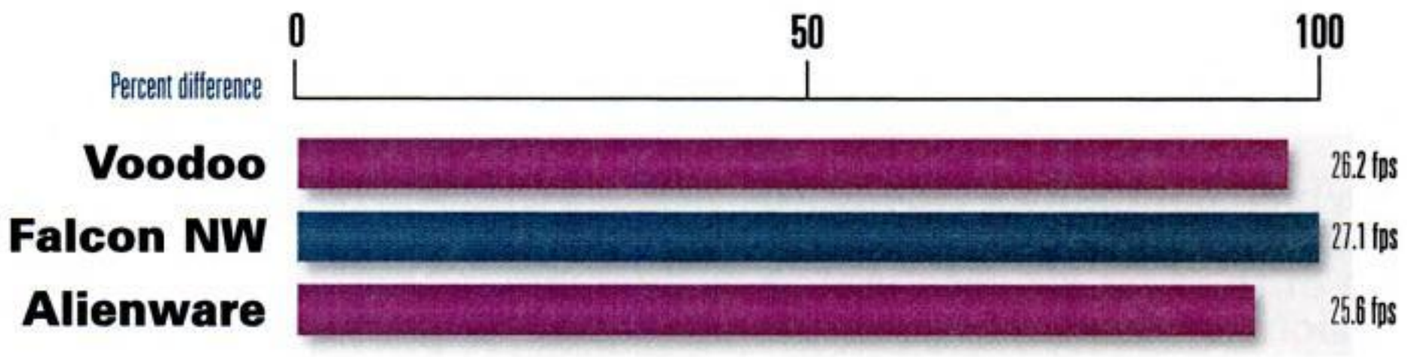
■ QUAKE III QUAVER

This intense deathmatch scenario is chock full of polygons—so the benchmark challenges not only the videocard's fill rate but also the CPU's ability to crunch vertices. This test was run at 1280x1024 in 32-bit color with all settings at their highest levels.



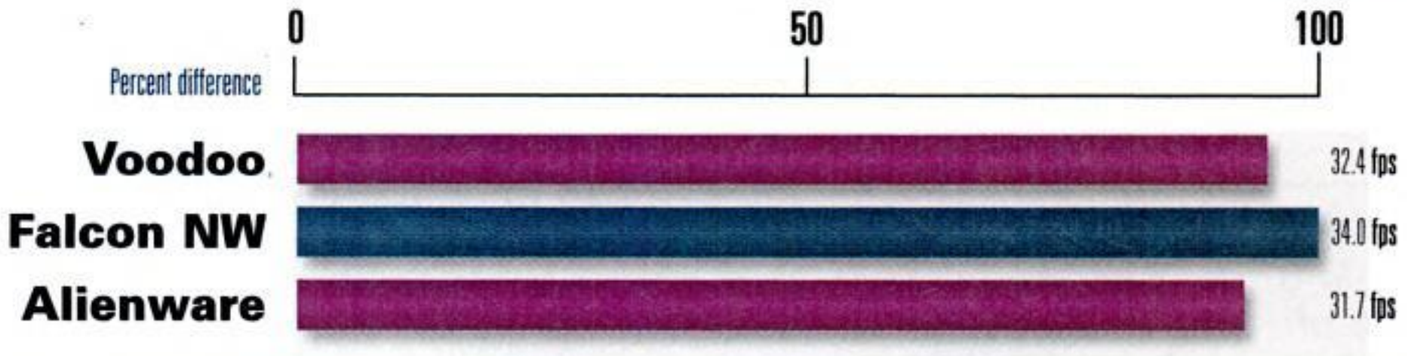
■ AQUAMARK

AquaMark is a new DirectX 8 benchmark based on the submarine game *AquaNox*. It tests the videocard's programmable pixel shaders, but doesn't include any vertex shader effects. *AquaMark* was run at 1280x1024 in 32-bit color. Anti-aliasing was disabled.



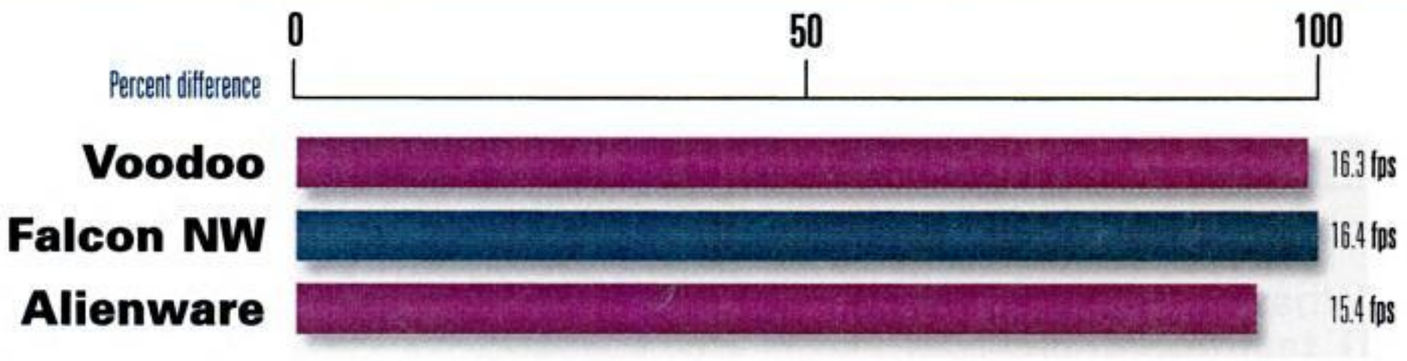
■ 3DMARK2001 GAME 2

3*DMark*2001's second game benchmark tests Direct3D functionality using the D3D 7 pipeline. Game 2 doesn't test performance of pixel or vertex shaders. It was run at 1280x1024 with 32-bit color, in the High Detail, D3D Pure Hardware mode.



■ 3DMARK2001 GAME 4

Game 4 tests the performance of programmable pixel and vertex shaders in a Direct3D 8 environment. It was run at 1280x1024 in 32-bit color, in the High Detail, D3D Pure Hardware mode.



AND THE WINNER IS...

If you're scoring at home, don't try to determine who won the war by figuring out which PC won the most battles; we arrived at our final rankings by weighing all the battles differently. That stated, here's the good news:

Third Place: Voodoo Monsoon EGAD-DDR/1333

While the Voodoo system has some awesome extras—a beautiful monitor, the best cabling job ever, a massive RAID array—we can't justify its stratospheric price, especially when its ATI TV tuner is crap-tastic enough to bring down our overall opinion of the system. If the Monsoon had benchmarked on par with the Falcon MACH V, we might have forgiven the fact that it's almost $3,000 more than the Falcon Northwest system. In fact, we couldn't figure out why it was so expensive, so we double-checked with Voodoo to make sure it didn't send the price for this system in Canadian currency. It didn't; the rig's just really expensive.

Second Place: Alienware Aurora DDR

The Alienware Aurora DDR is a beautiful, well-built gaming rig, but its slightly slower scores in all of our benchmarks, combined with poor hardware choices—the system has only 36GB of storage, a crappy keyboard, and is the slowest performer of the bunch—keep the Aurora out of the top spot. That said, it's still a great gaming machine, and we were impressed with both its performance and value. And if you want to be delivered from the boredom of standard beige, Alienware is certainly your best bet.

.

First Place: Falcon Northwest MACH V

The loving attention Falcon gives to each system really shows in the final product. By carefully overclocking the Hercules 3D Prophet 3 in our system, Falcon was able to squeeze an extra 5 percent of performance out of an already snappy videocard. We don't really like the Optiquest monitor, but the inclusion of the new Klipsch Promedia 4.1s nearly counteracts that gaffe. The MACH V is also the only system that can compete with major OEMs in the pricing department. Though none of the big OEMs have yet announced pricing on GeForce3 systems, our bet is that they'll show up in the same price range as the Falcon, with different speakers and a standard case. And Falcon has proven that more expensive doesn't always equal faster. In this roundup, the best system is also the least expensive. ✹

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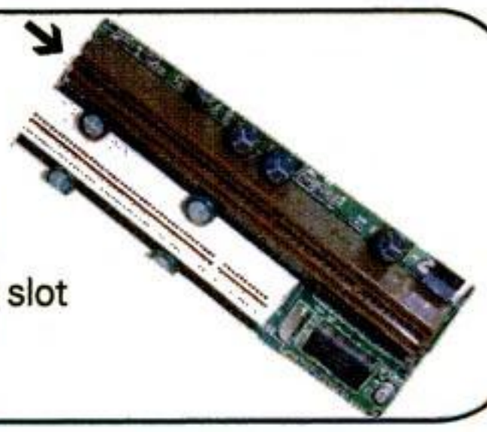
TEST YOUR GEEK QUOTIENT

Answer Online! If you're too lazy (or not geeky enough) to compute your score by yourself, you can take the test online and we'll crunch the final tally for you. Go to www.maximumpc.com/geektest anytime after May 11.

1. Which company's videocard was required to run *VQuake*, one of the first 3D-accelerated versions of *Quake*?

a) 3dfx
b) Matrox
c) Rendition
d) Number Nine

2. This is a picture of:



a) an ISA slot
b) an AGPslot
c) an AGP Pro slot
d) a CNR slot

3. What are the two major CRT technologies?

a) aperture grille & shadow mask
b) thin-film transistor & dual-scan super-twisted nematic
c) bilinear filtering & anistropic filtering
d) Diamondtron & Trinitron

4. What is the abbreviation for a Rambus module?

a) RIMM
b) RISC
c) RJ-21
d) RDRAM

5. Which is the correct Intel architecture timeline, from least advanced to most advanced?

a) Coppermine, Deschutes, Klamath, Itanium, Willamette, Katmai
b) Klamath, Deschutes, Katmai, Coppermine, Willamette, Itanium
c) Katmai, Deschutes, Klamath, Coppermine, Willamette, Itanium
d) Willamette, Coppermine, Klamath, Itanium, Katmai, Deschutes

6. How fast does the L2 cache run on a 1GHz Classic Athlon?

a) 300MHz
b) 333MHz
c) 500MHz
d) 1GHz

7. Which is the most popular type of motherboard in modern-day, consumer-level, mid-tower PCs?

a) ATX
b) NLX
c) AT
d) Baby AT

8. Which motherboard company is based in the United States?

a) Asus
b) Abit
c) Biostar
d) Tyan

9. Which lets you redefine CPU clock speed?

a) adding/removing active cooling
b) tweaking FSB speed and multiplier
c) System Properties
d) System Tools

10. What kind of calculations did the "math co-processor" make?

a) floating-point
b) integer
c) binary
d) parallel

11. In what city is Intel based?

a) Santa Clara
b) Cupertino
c) San Jose
d) Mountain View

12. Who is credited with inventing the web?

a) Vinton Cerf
b) Marc Andreesen
c) Ramon Khandelwal
d) Tim Berners-Lee

13. This is a picture of:

a) a serial port
b) a parallel port
c) a midi port
d) a SPDIF

14. What is the current state-of-the-art in CPU process technology available on retail shelves?

a) 0.13 micron
b) 0.18 micron
c) 0.25 micron
d) 0.35 micron

Answers 1-c, 2-c, 3-a, 4-a, 5-b

Answers 6-b, 7-a, 8-d, 9-b

Answers 10-a, 11-a, 12-d, 13-a, 14-b

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"If you take a pencil that won't hold lead, looks like a pipe cleaner attached to a head, add a buggy-whip body with a brain that leaks, you got yourself a grit-eating, scum-sucking, pencil-necked geek."

So sang Freddie Blassie about the proto-geek of days past. But the geek species has evolved, and now PC gearheads like us wear the term as a badge of honor. Tech-geeks have not only exacted their revenge on the lunkheads of the world, they've also added a few pounds of muscle and scored with the hotties.

Do you have enough hardcore computer knowledge to join the New Geek Order?

Find out by taking our little exam. Some questions are no-brainers, others will make you pause, and a select few can only be answered by the small pocket of the geek population that eats, breathes, and lives PC minutia.

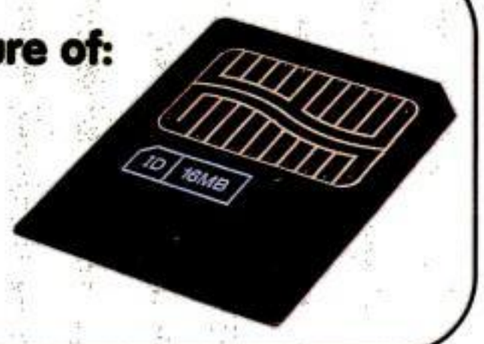
You can find answers on the bottom of each page, and a scoring guide on page 41. Alpha-grade PC geeks may proceed to the front of the line and begin humiliating lesser human beings immediately. **—Jon Phillips**

15. What term is synonymous with Internet bulletin boards?

a) FTP
b) Telnet
c) IRC
d) Usenet

16. This is a picture of:

a) CompactFlash
b) Memory Stick
c) MultiMediaCard
d) SmartMedia



17. Kibo is:

a) a famous hacker
b) an illegal Linux distribution
c) an Internet religious figure
d) a computer virus that turned on its creator

18. How many wires are live in a Cat-5 cable?

a) 1
b) 2
c) 4
d) 5

19. Where can you find the Southbridge?

a) on a videocard
b) in a hard drive
c) in *Command & Conquer*
d) in a core-logic chipset

Illustration Mark Harris

20. What is the ".1" in Dolby Digital 5.1?

a) center channel
b) data-encoding stream
c) low-frequency effects channel
d) latest version number of spec

21. Which IP address is maximumpc.com forbidden from having?

a) 178.231.17.7
b) 192.168.55.7
c) 204.252.16.3
d) 142.103.34.2

22. What is the minimum number of drives for a RAID 5 array?

a) 1
b) 2
c) 3
d) 4

23. What device demands an 80-pin connector?

a) ATA/100 hard drive
b) Ultra 160 hard drive
c) floppy drive
d) CD audio

24. Where is Black Mesa?

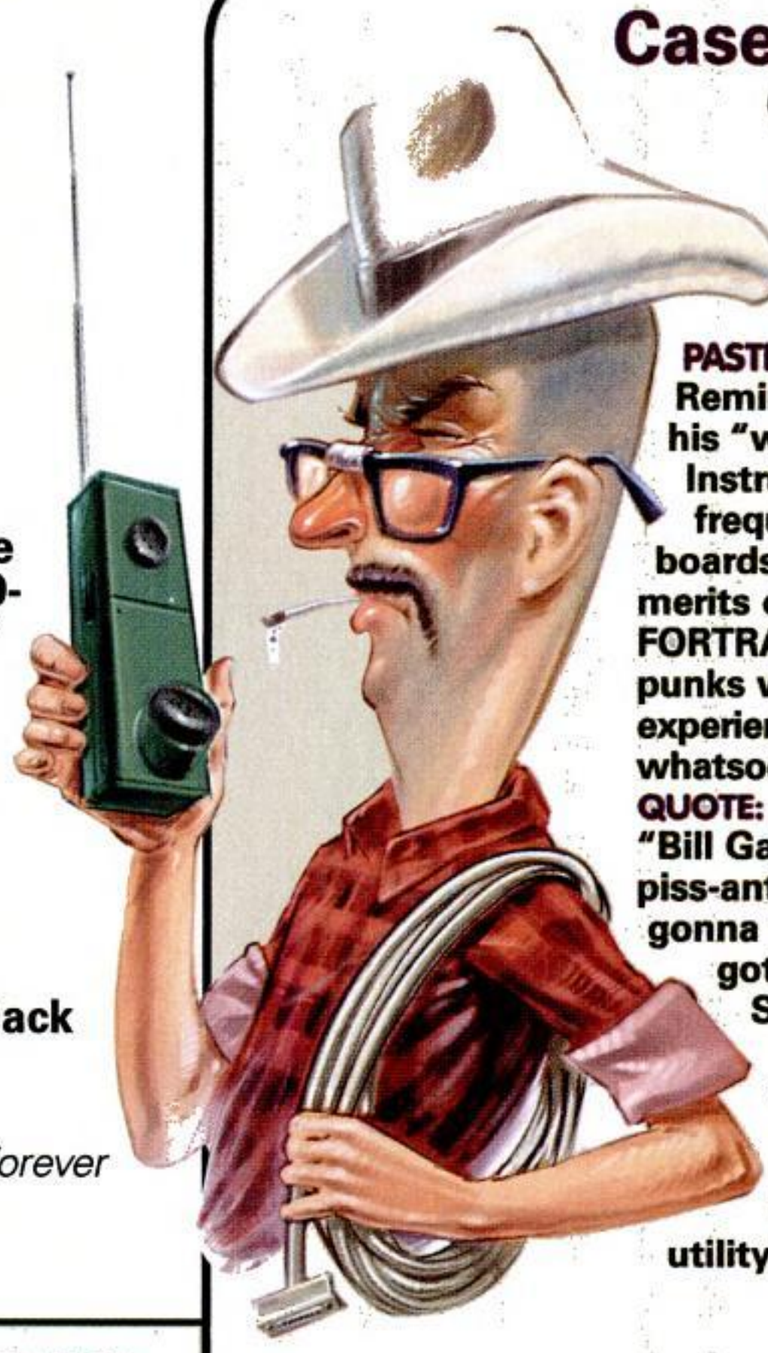
a) *Tribes*
b) *Duke Nukem Forever*
c) *Daikatana*
d) *Half-Life*

25. How many devices can fit in a single USB chain?

a) 4
b) 64
c) 123
d) 127

26. What OS is TiVo based on?

a) BeOS
b) Linux
c) WinCE
d) Amiga OS



Case Study A
COWBOY GEEK

OCCUPATION:
Runs a small ISP in an isolated section of Wyoming.

PASTIMES:
Reminisces about his "wild days" at Texas Instruments R&D and frequents obscure bulletin boards to argue the relative merits of COBOL and FORTRAN with 14-year-old punks who actually have no experience with programming whatsoever.

QUOTE:
"Bill Gates? That squirrelly piss-ant might think I'm gonna pay for his OS, but I've got a Kalashnikov named Svetlana and three weeks worth of survival gear that says he's wrong."

IDENTIFYING MARKINGS:
Wirecutters in his utility belt.

Answers 15-d, 16-d, 17-c, 18-c, 19-d

Answers 20-c, 21-b, 22-c, 23-a, 24-d, 25-d, 26-b

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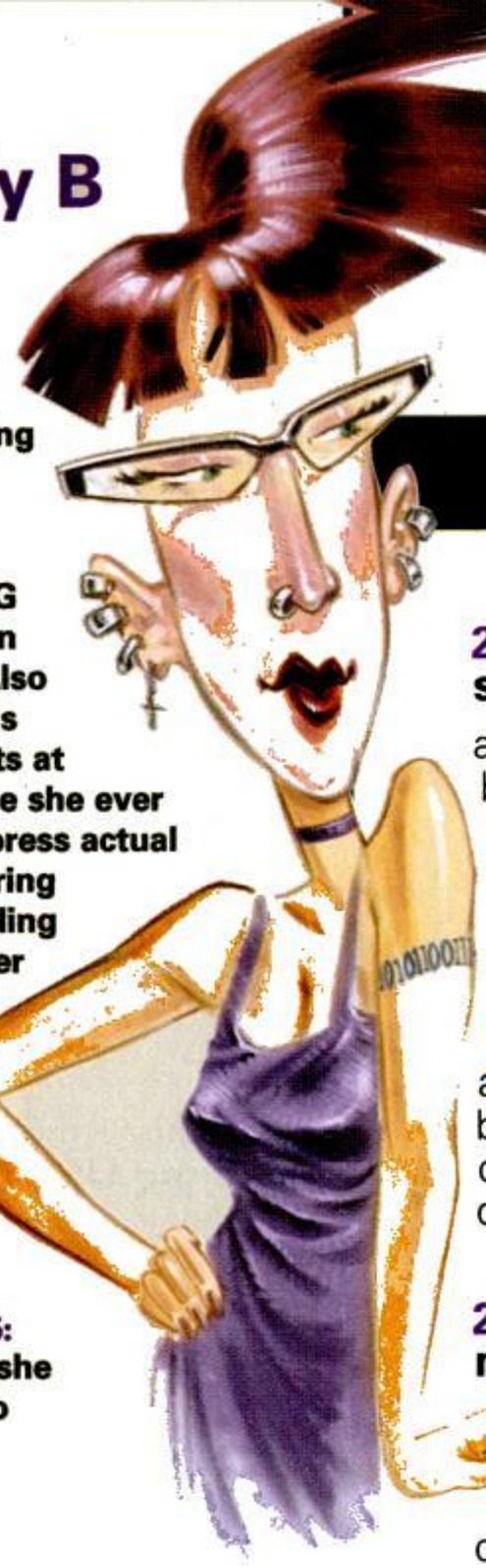
Case Study B

GRRL GEEK



OCCUPATION:
"Webmistress" for a dot-com specializing in the ritualistic burning of other people's money.

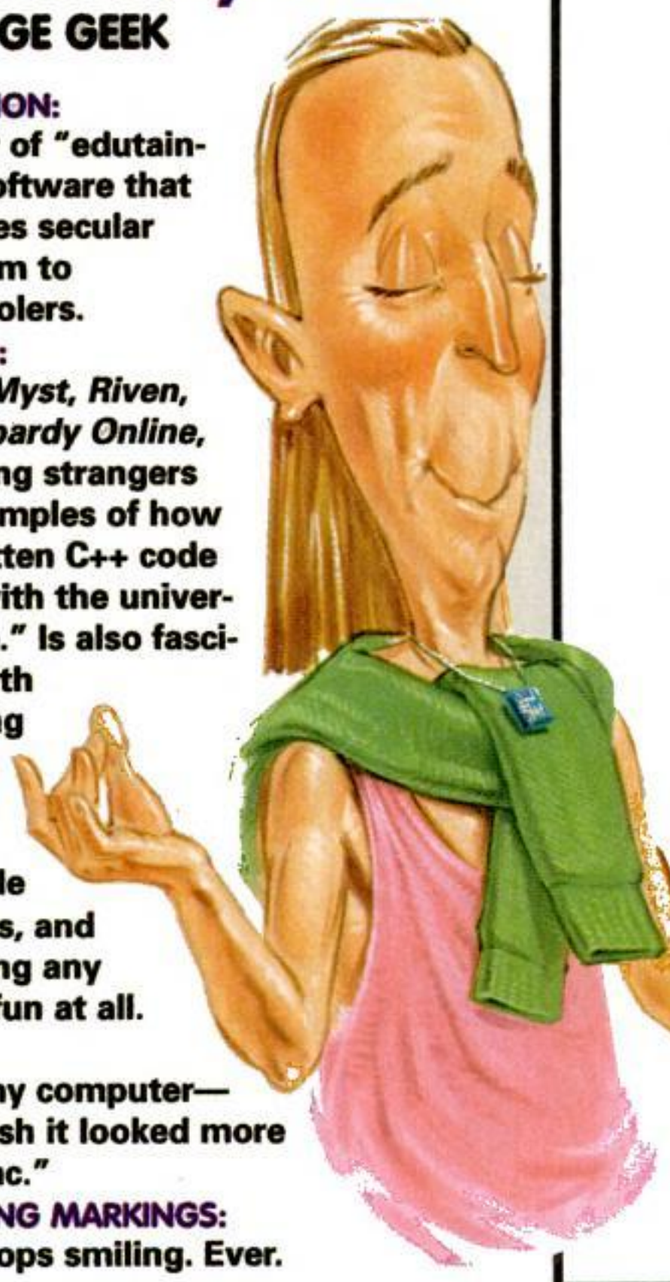
PASTIMES:
Criticizing a WYSIWYG editor she hasn't taken the time to explore. Also memorizing which DJs "spin" on which nights at Club Snub (just in case she ever has the chance to impress actual techno music fans during small-talk) and defending pornography whenever possible (so that bad boys will think she's "edgy").

QUOTE:
Some drivel about some *Flash* designer being "amazing."

IDENTIFYING MARKINGS:
A severe haircut that she mistakenly believes to be attractive.

Case Study C

NEW-AGE GEEK



OCCUPATION:
Designer of "edutainment" software that introduces secular humanism to pre-schoolers.

PASTIMES:
Playing *Myst, Riven,* and *Jeopardy Online,* and boring strangers with examples of how well-written C++ code "sings with the universal pulse." Is also fascinated with not eating meat, not consuming perishable resources, and not having any visceral fun at all.

QUOTE:
"I love my computer—I only wish it looked more like a Mac."

IDENTIFYING MARKINGS:
Never stops smiling. Ever.

27. What does BSOD stand for?

a) binary system output data
b) blue screen of death
c) backside on-die
d) branch send on demand

28. What does FDISK do?

a) partitions a hard disk
b) erases a hard disk
c) scans a hard disk
d) defragments a hard disk

29. Which holds the most data?

a) Zip disc
b) Jaz disc
c) LS120
d) CD-RW

30. At what refresh rate are you sure to see visible flicker in a CRT?

a) 60Hz
b) 75Hz
b) 90Hz
c) 105Hz

31. What application would you use to open a PNG file?

a) *Word*
b) *Premiere*
c) *Photoshop*
d) *Winamp*

32. Who are the bad guys in *Unreal*?

a) Strogg
b) Scourge
c) Skaarj
d) Skrall

33. Which of the following is still in business?

a) Aureal
b) Syquest
c) 3dfx
d) 3Dlabs

34. Which has never been a developer of 3D graphics chips?

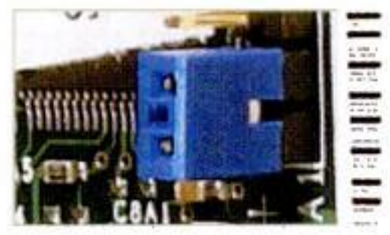
a) Number Nine
b) Turtle Beach
c) Bit Boys Oy
d) Intel

35. Which chip has the most transistors?

a) GeForce3
b) Athlon
c) Pentium 4
d) Crusoe

36. This is a picture of:

a) a lead
b) a trace
c) a jumper
d) a circuit



37. What's another name for FireWire?

a) IEEE 10861
b) IEEE 1492
c) IEEE 802.11
d) IEEE 1394

38. Which technology offers the slowest throughput?

a) USB
b) parallel port
c) serial bus
d) 56K modem

39. Who is John Romero's girlfriend?

a) Stevie Nicks
b) Stevie Case
c) Julie Strain
d) Kate Archer

40. Which is not a CPU cooling strategy?

a) mineral oil
b) peltier cooler
c) glycol filter
d) heat pipe

Answers 27-b, 28-a, 29-b, 30-a, 31-c, 32-c, 33-d

Answers 34-b, 35-a, 36-c, 37-d, 38-d, 39-b, 40-c

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TEST YOUR GEEK QUOTIENT

41. Which rig is famous for its overclockability?

a) Intel Seattle II/P-III 600 Katmai
b) Abit BH6/Celeron 300A
c) Intel Vancouver/P-III 1GHz
d) Abit BH6/P-II 300 Klamath

42. What is the Palm's much-heralded input language?

a) C+
b) Graffiti
c) English
d) Esperanto

43. Who is Kevin Mitnick?

a) a hacker
b) a CEO
c) an inventor
d) a game protagonist

44. What is the hexadecimal value of pure black?

a) CCCCCC
b) FFFFFF
c) 000000
d) 999999

45. Who founded Apple?

a) Wiz
b) Woz
c) Don Was
d) Andy Grove

46. What is the default font for the Windows desktop?

a) Microsoft Arial
b) Windows San Serif
c) MS Outlook
d) Tahoma

47. How do you minimize all windows?

a) Alt-Tab
b) Ctrl-W
c) Alt-F4
d) Windows key-M

48. What is the fastest spindle speed in currently shipping ATA drives?

a) 5,400 rpm
b) 7,200 rpm
c) 10,000 rpm
d) 15,000 rpm

SCORE YOUR TEST

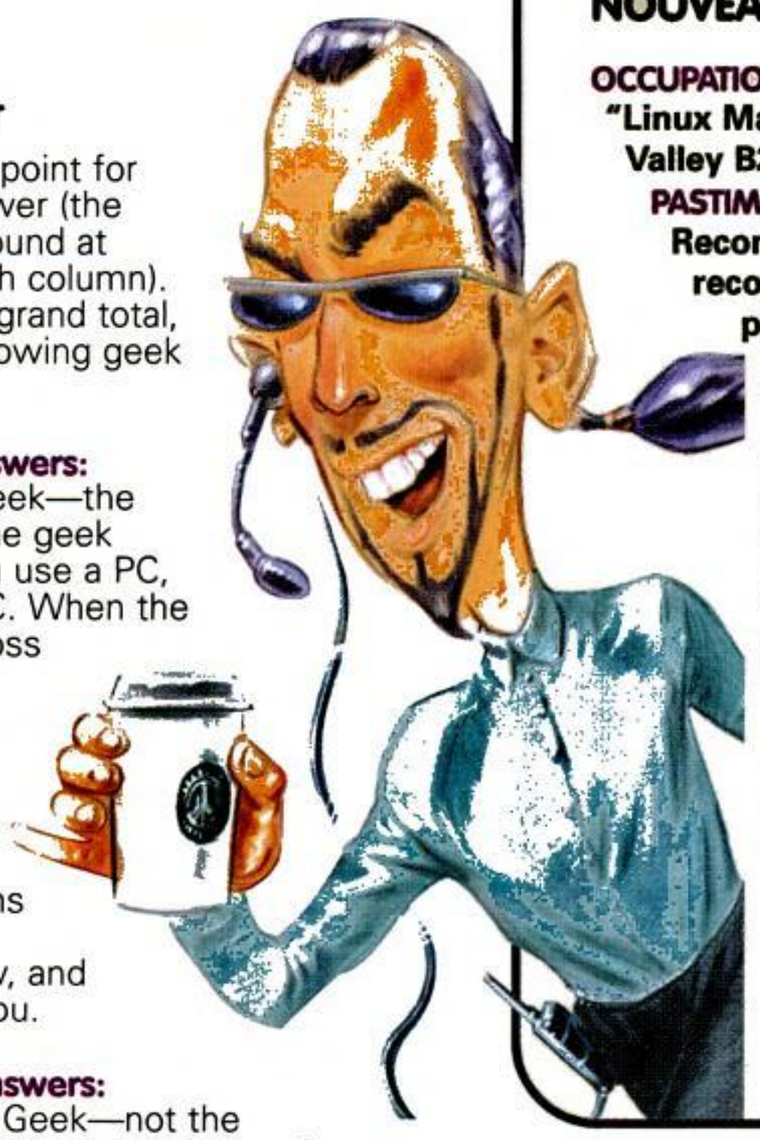
Give yourself one point for every correct answer (the answers can be found at the bottom of each column). Now add up your grand total, and check the following geek hierarchy:

0 to 12 correct answers:
You are a Delta Geek—the lowliest geek in the geek pecking order. You use a PC, but don't *use* a PC. When the cursor moves across the screen, you flinch like a frightened rabbit because you don't understand what's happening. Your suspicions are correct: It is a strange little arrow, and it *is* trying to kill you.

13 to 24 correct answers:
You are a Gamma Geek—not the lowliest dog feasting on the sinew of gutted testing systems, but certainly not as digitally dominant as the Alpha Geek. Still, you do know your way around a PC with some level of competency. Good enough for government work, indeed.

25 to 36 correct answers:
You are a Beta Geek—you know more about PCs than some *Maximum PC* editors and most *Maximum PC* readers. You eat, drink, and breathe PC hardware, which explains why your name is "Fun Tony" at LAN parties, but "Relentlessly Annoying Tony" at PTA meetings.

37 to 48 correct answers:
Whoah. Once again: WHOAH! You are Alpha Geek, the one and only, the font of all PC knowledge, god-like and omnipotent, the master of all things PCB. Now go outside and get some fresh air. The seat of your office chair is developing a depression deeper than the Grand Canyon.



Case Study D
NOUVEAU RICHE GEEK

OCCUPATION:
"Linux Maharishi" for a Silicon Valley B2B portal.
PASTIMES:
Recompiling his kernel, recompiling his stock portfolio, and recompiling his Starbucks half-double, half-caf Crappacino with a twist of unrepentant gall.
QUOTE:
"Ordering sushi is like having sex, Beatrice. You have to get kinkier and kinkier in order to feel any rush at all."
IDENTIFYING MARKINGS:
1999 Porsche Boxster (with just 7,000 miles on the odometer—all of them commute).

Case Study E
FUNYON GEEK

OCCUPATION:
Works nights at the Video Vault, but dabbles in "graphic design" for up-and-coming start-ups such as Tina's Terrariums and The Buckle Shack.
PASTIMES:
***Quake III Arena*—but only in Q3DM17 ("because I vanquished all signs of humanoid life on lesser levels ages ago"). Also submits regularly to the annual CorelDraw! Clip-Art Contest and leads write-in campaign to have "The Sopranos" universe licensed as a text adventure.**
QUOTE:
"I can assure you with metaphysical certainty, my good man, that Munchos are indeed the brainchild of Frito-Lay."
IDENTIFYING MARKINGS:
T-shirts bearing the logos of technology companies.

Answers 41-b, 42-b, 43-a, 44-c, 45-b, 46-b, 47-d, 48-b

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SUB-ZERO

THE ICEBOX COMETH

Here's how it got from Point A to Point B

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HOW WE PAINTED AND DECALED OUR OWN PC HOT-ROD

Ever met the owner of a classic hot-rod? He's probably tricked out more than just what's under the hood—he's likely also reinvented the car's exterior, which can mean anything from adding a few pieces of chrome to turning a coupe into a cabriolet. No hot-rod worth its pink slip is without a custom paint job and maybe a decal or two.

So why haven't you tricked out your pride and joy? Your PC is smokin' fast on the inside—so why not make it just as hot on the outside? Or for that matter, why not make it just as *cool* on the outside? That was our mission when we created Sub-Zero, our homage to chilly-chill, actively cooled, overclocking goodness.

—Scott Tarr

FOLLOW ALONG AS WE SHOW YOU HOW TO CUSTOM-PAINT YOUR PRIDE AND JOY.

ITEMS NEEDED:

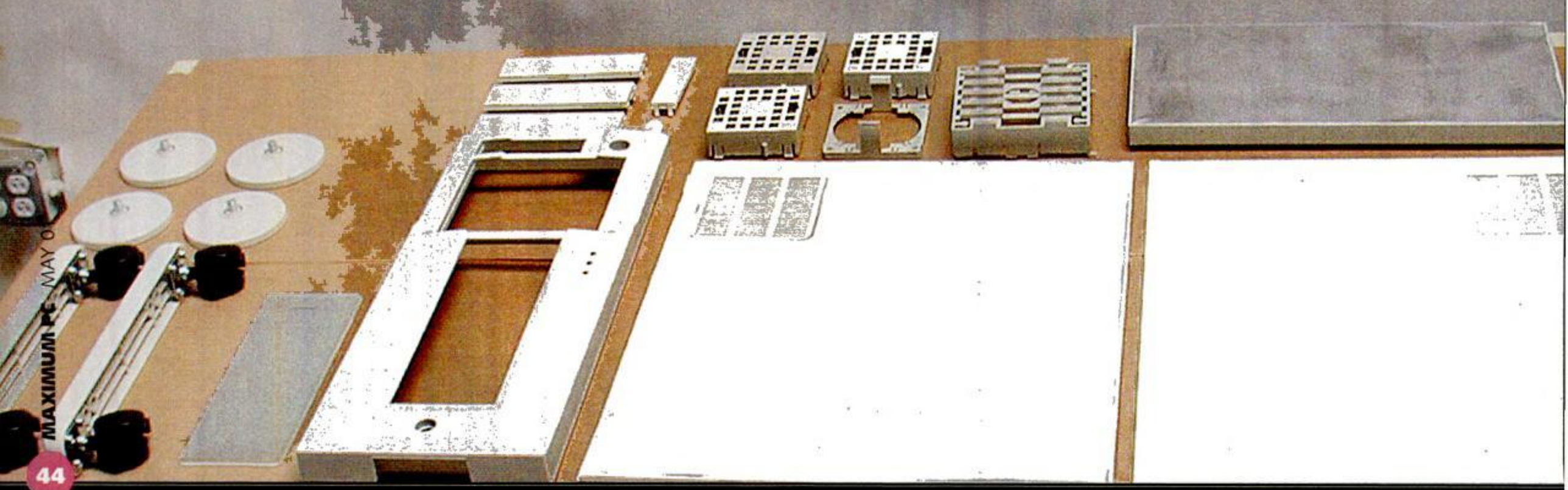
- Sandpaper of various grits
- Sherwin-Williams metallic-style automotive-grade paint, Blue #35-42181
- Sherwin-Williams Jet Seal Gray primer/sealer in a spray can
- Dupli-Color clear paint in a spray can
- Masking tape
- Vaseline
- Small paint-brush
- X-Acto knife
- Plastic primer
- Orbital sander
- Finishing compound
- Car wax
- Decal
- Lint-free cloth
- Tools to take case apart

1 PREP YOUR WORK AREA

The best place to paint your case is indoors; outside, there's the danger of wind spraying paint all over the place. There's also a good chance that dust or grass will muck up your paint job. In any case, you'll also need enough room to maneuver and to lay out drying parts, so consider that when choosing your space. We used an abandoned dot-com office.

2 DISASSEMBLE CASE

If you're gonna **do this project, do it right, which means completely disassembling your case. Sides, front, top, front optical-drive panels—they all need to come off. On some cases, the top panel is riveted on. If yours is, you'll need some newspaper or plastic and masking tape to cover any parts—such as, say, the inside of the case—that need protection from the paint.**



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3 STRIP THE CASE

For a paint job smooth as a baby's behind that will last forever, you need to sand the case down to the bare metal. If you don't sand that far, the primer won't stick to the case and your prodigious painting stylings will be for naught.

Unless you're a world-class bodybuilder, this is not a hand-sanding project. We rented an orbital sander to work on the larger sections of the case. However, you will need to hand-sand any plastic parts, because the orbital sander might damage the plastic. You might also want to hand-sand any other small parts, because the orbital sander can be rather unwieldy and might damage *you*.

4 MASK THE CASE

Some parts of the case—such as exposed screws, or anything made of rubber or a material that won't hold paint—must be covered so they won't be coated when you start painting. Simply swathe those areas in masking tape. If your paint job involves multiple colors, spray the primer coat (step 5) before you mask any areas that shouldn't be covered in the first color you plan to paint with.

Be sure to trim the tape so it doesn't inadvertently cover small areas that should actually receive paint. An X-Acto knife will do the trick.

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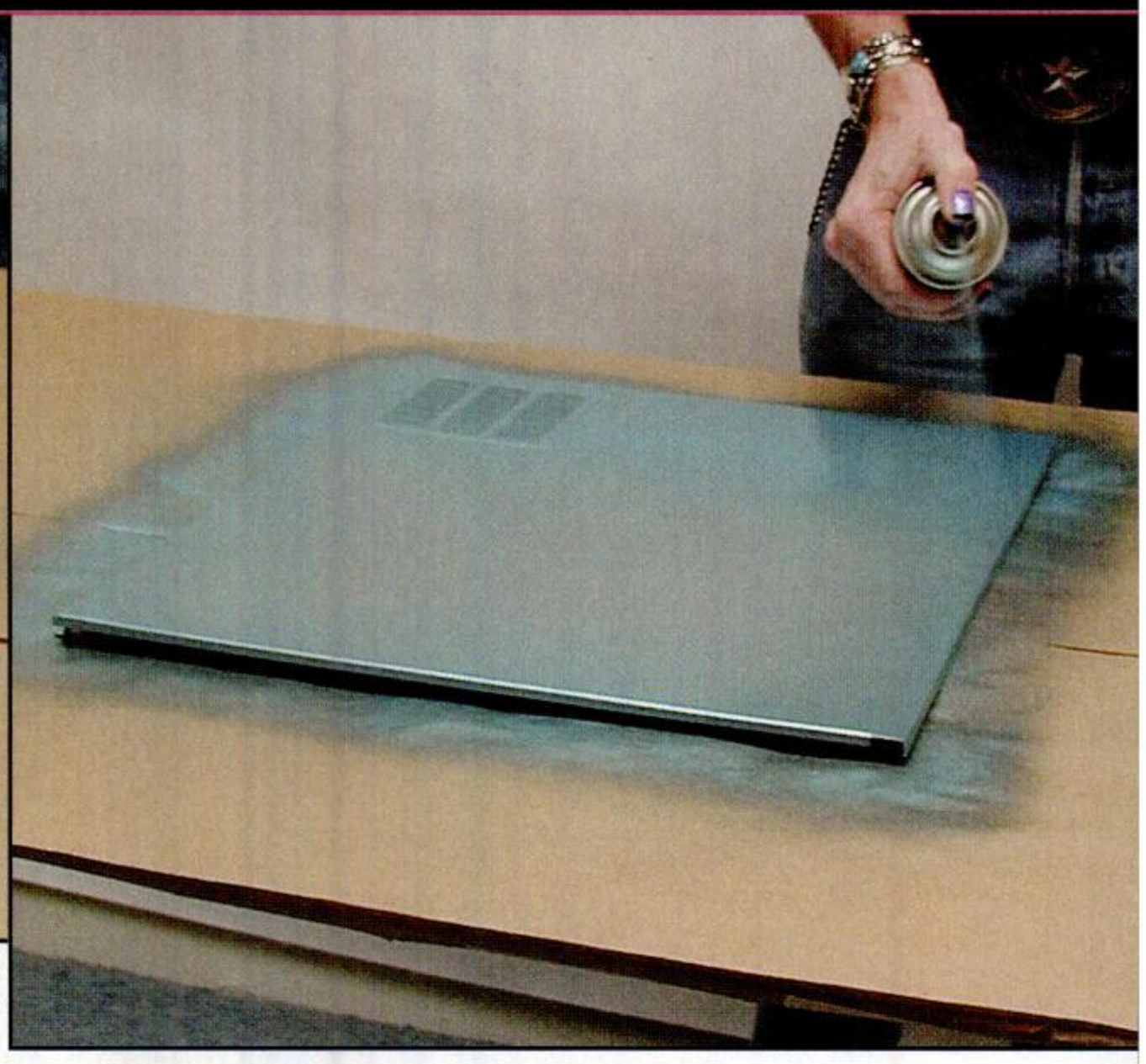
5 APPLY THE PRIMER COAT

Before you go any further, thoroughly clean all the dust and grime from all surfaces to be painted—we used old-fashioned water and a lint-free cloth. You might even want to sweep or vacuum your work area, so the dust you've spread around during the sanding process doesn't get caught in an air current and pasted onto the case while the primer is wet.

Apply the primer in smooth, even strokes. It's better to spray two thin coats instead of one thick coat. You want to avoid any primer pile-up that might drip, but if you do get some drippy droplets, sand them down after the primer is dry.

Let the primer dry completely (about two hours) then hand-sand it, first with 600 grit sandpaper, then with 1000 grit sandpaper. You'll be hand-sanding everything from here on out.



6 PAINT

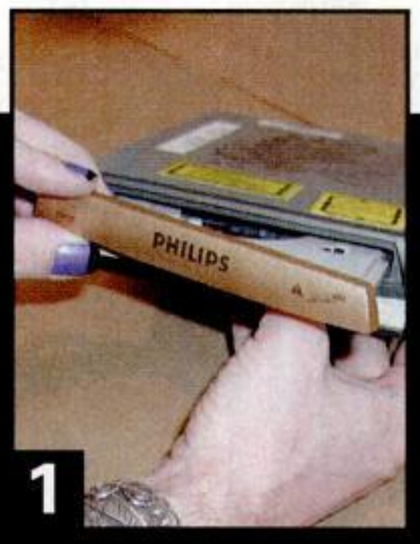
Once the primer has been sanded to a buttery-smooth finish, clean everything once again to remove any grit. If you'll be painting in multiple colors, now is the time to mask the areas of the case that shouldn't be painted with the first color you're going to apply. (For details on choosing the right paint, see the sidebar on page 48.)

Again, don't paint one thick coat. Instead, take your time and apply the paint in two thin coats. As with the primer, apply the paint with smooth, even strokes that go in the same direction, and take special care not to overpaint. (Patience, grasshopper!)

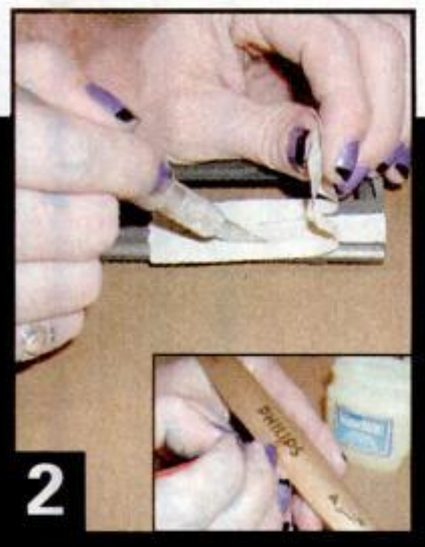
After the paint dries (overnight is best), use 800 to 1000 grit sandpaper to sand it super-smooth. Then apply another coat of paint, let it dry, and sand it.

PAINTING THE DETAILS

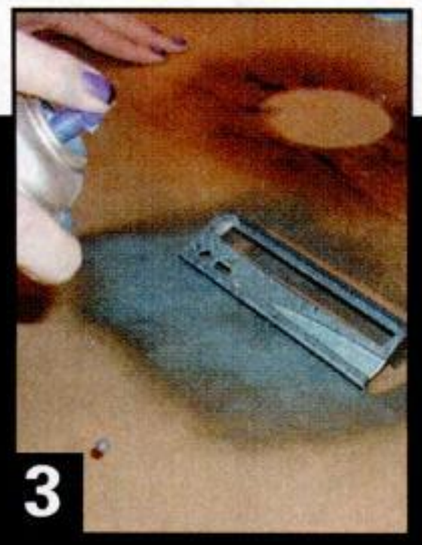
Drive painting involves essentially the same steps as case painting. The only difference is that the surface area for the paint is smaller, and you'll probably want to mask off logos so that the drive looks as though it was painted at the factory. You'll also need to mask off LEDs.



1 Remove the front face from the drive.



2 Mask any LEDs or logos with tape, or use Vaseline applied with a fine paint brush to keep paint from adhering.



3 Apply the color in thin, even strokes. After the color has dried, use an X-Acto knife to cut the tape away from the logos, then spray the drive with a clear coat.

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a sentence with
"If only I could..."

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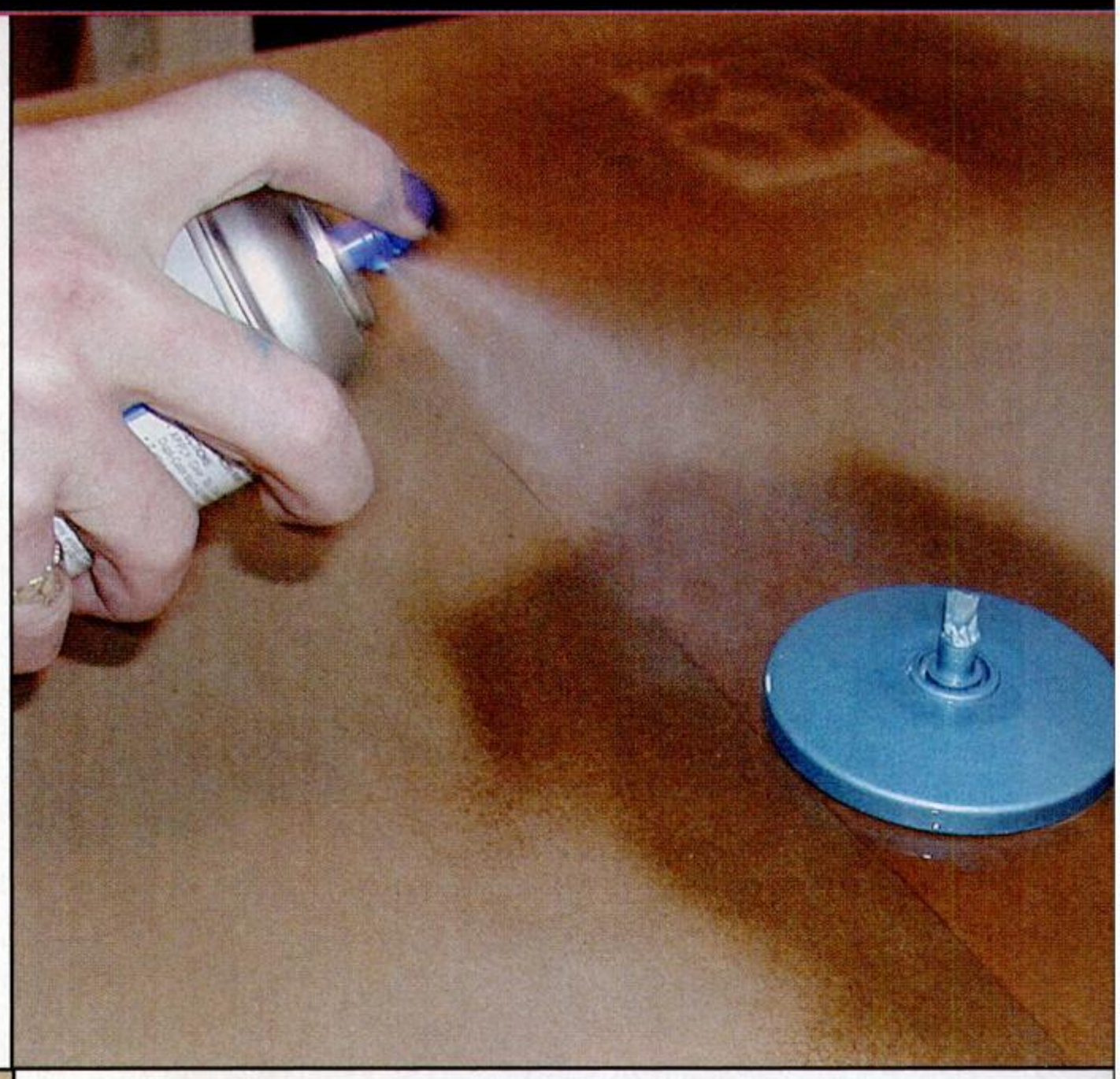
7 APPLY GLOSS

You'll repeat the same process when painting the clear coat—paint one coat, sand it, then paint the second. As always, take your time and apply thin coats. Don't worry if your first coat looks a little rough; you'll be sanding it down anyway. This time, sand with 1000 to 1500 grit sandpaper, and sand very gently so you don't damage the color. If you want your case to look extra glossy, you can apply a third coat. In any case, don't sand the last coat.



8 BUFF WITH COMPOUND AND WAX

Think this thing looks good? You haven't seen anything yet. After you've let the clear coat dry completely, use some polishing compound to take off the overspray. Apply it gently, though, or you'll put scratches in your new gloss coat. (If that does happen, just spray another gloss coat over your mistake and start over.)

Wipe away the compound with a clean cloth and protect your hard work by applying wax—your favorite car wax will do nicely.

PICKING THE RIGHT PAINT

We could have rigged a paint gun or paid money to a professional to get our case painted, but then we'd have missed out on the feeling of accomplishment (and subsequent boasting rights) that comes from doing this kind of project on your own. But if you're going to do it yourself, be sure you're using the right kind of paint—essentially automotive-grade. It's not easy to find it in a spray can (as opposed to getting yourself a professional paint gun), but the nice people at Sherwin-Williams were happy to oblige, though we did have to buy six cans of Acrylic Enamel Blue #35-42181. Total cost was about $52.

What you really need to know about paint is this: Don't mix acrylic and enamel paints and glosses, or your paint will turn into crap. Try to use the same paint manufacturer when selecting paint and glosses. If you're not sure about the paint and the gloss, do a test run on a small piece, such as the 5 1/2-inch drive fillers or a drive rail or anything that isn't your case.

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sweet 16

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9 REASSEMBLE CASE

Once everything's been buffed and waxed, it's time to put the whole enchilada back together. Round up the necessary screws and get crackin'.

10 ADD DECAL

We commissioned Xplane, a design house, to render a decal that would announce Sub-Zero's snow-miserly presence to the world. You can design your own decal and check the Yellow Pages for printing services that will actually print the decal on vinyl for application to cars. These services will work with you to create the design you want and will often even do the drawing for you, if you're not artistically inclined. Our decal was composed in Adobe *Illustrator* and cost $42 to have printed and top-coated with frosted vinyl at Michael's Ink. in San Francisco.

When you're ready to apply the decal, start on one edge—we chose the top for its straight line—and slowly work your way across. Be sure not to allow any bubbles to form under the decal as you apply it.

COOL ON THE INSIDE.

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COOLER ON THE OUTSIDE.

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PC Pranks

There are a zillion ways to mess with your friends' PCs. Here are a few of our favorites....

BY KRISTEN SALVATORE

Staying alert is a particularly stringent requirement for *Maximum PC* editors. Outside the usual hazards of our jobs—sharp components, dangerous power tools, the possibility that something in the Lab might suddenly go up in flames—a new menace has reared its head: The Prankster Co-Worker.

Years of rich tradition dictate that new hires to the magazine endure a hazing process that has included everything from cleaning the Lab to massaging the feet of the senior editors. And of course, *Maximum PC* newbies are typically the targets of PC pranks. Our newest hires—Reviews Editor Rob Pratt, Online Editor Bill McClendon, Disc Editor Ed Champion, and Associate Editor Logan Decker—are no exception.

But it's possible that we old-timers (relatively speaking, anyway) underestimated the chutzpah of these young turks, because this particular group of newbies has a bundle of tricks up their collective sleeve. And since the first piece of tape was applied to the first mouse ball on the day the first of them arrived, it's been a no-holds-barred battle to see who can outprank whom.

How bad is it? Here's a look at one week's worth of battles in the raging *Maximum PC* Pranks War.

Monday

The Prankster: Gordon Mah Ung, senior editor

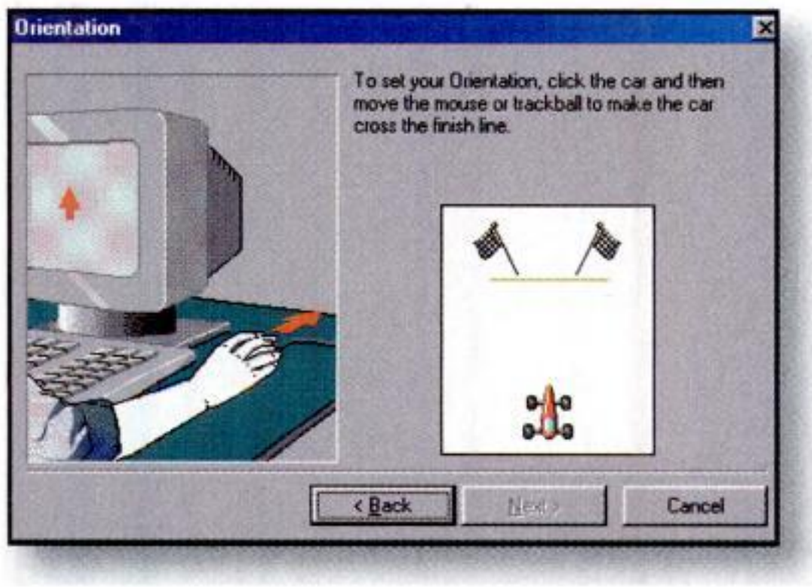
The Prankee: Ed Champion, disc editor

The Put-On: Gordon wormed his way into Bill's Mouse settings through the Control Panel. Though these settings may vary somewhat from PC to PC (depending on the drivers used), nearly all of them include an option for setting the mouse's orientation. Usually, you're prompted to click on a picture of a race car and drag it across a line. Gordon simply dragged the race car sideways, so the orientation of the mouse on Ed's computer was skewed (e.g., moving the mouse to the left made the cursor move up, moving the mouse up made the cursor go right, etc.).

As if that weren't bad enough, Gordon made it impossible for Ed to even attempt to troubleshoot the problem, because he removed the Mouse applet from Ed's Control Panel. How? He chose "Run" from the Start Menu and typed "Control.ini" in the dialog box. When the file opened in Notepad, he located the section header "[don't load]" (it's toward the top) and typed "Main.cpl = no" under it. He saved the file, exited the Control Panel, then reopened it. Bye-bye, Mouse applet! (And for that matter, bye-bye Keyboard applet, Printer applet, and Font applet, too).

The Fallout: Ed's such a happy guy, even the Mouse from Hell didn't seem to rain on his parade, though he definitely appeared puzzled when moving the mouse up made his cursor move to the side. He spent a few minutes moving the mouse in circles and watching the

To muck up someone's mouse orentation, just drag the race car sideways.


Orientation
To set your Orientation, click the car and then move the mouse or trackball to make the car cross the finish line.
< Back
Next >
Cancel

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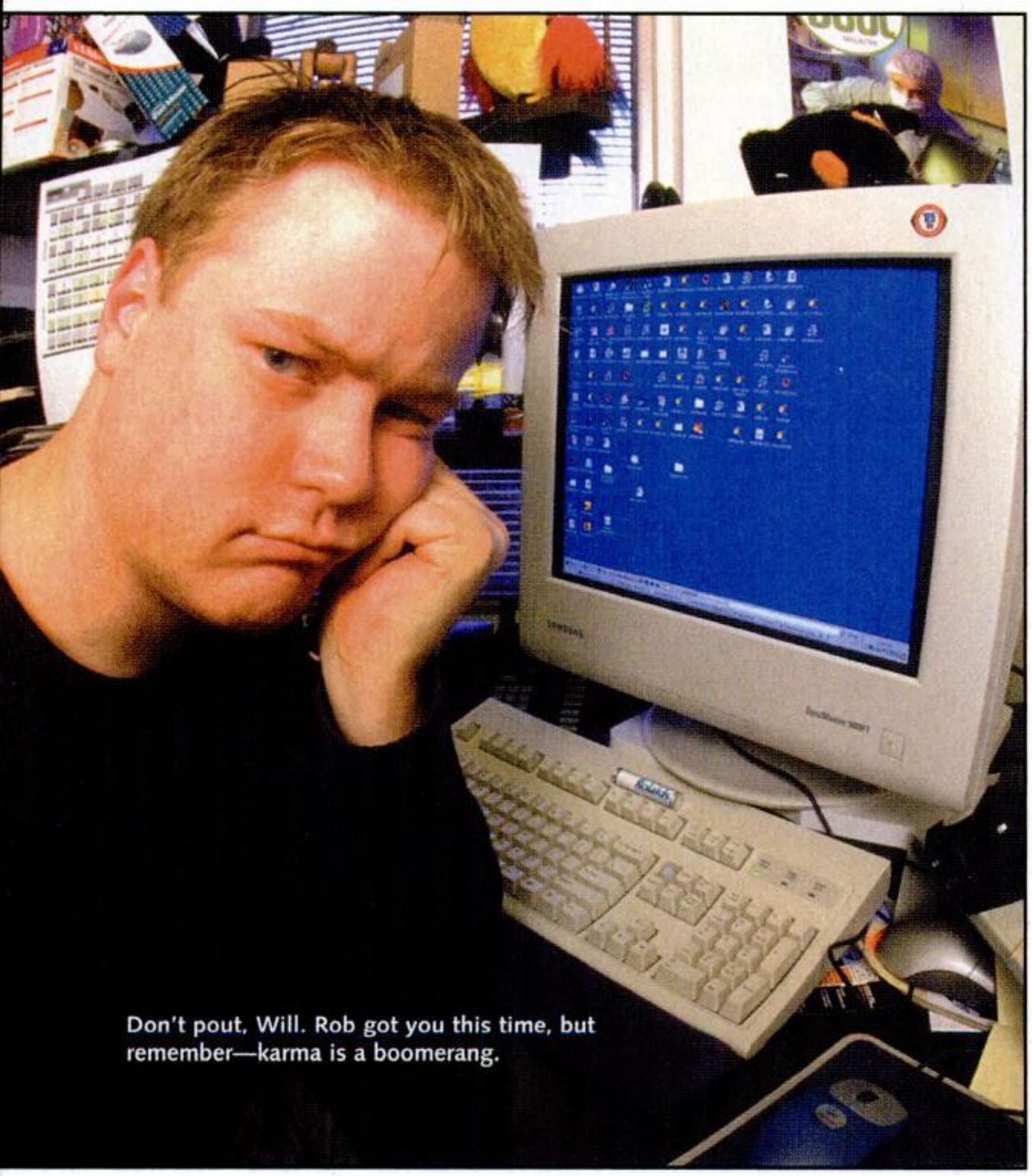
PC Pranks



Don't pout, Will. Rob got you this time, but remember—karma is a boomerang.

cursor fly in every direction before cheerfully unplugging the mouse and plugging it back in a few times. He even managed to painstakingly navigate his way into the Control Panel, where, of course, he found a whole lotta nothing. After rebooting twice in hopes of bringing back the missing Mouse applet, he shrugged and smiled and joined the rest of us for lunch.

But midway through the meal, Ed excused himself and never returned. When we made our way back to our desks, we found him lighting novena candles and whispering incantations to exorcise "the demon rodent."

No one has played any pranks on Ed since. He's a little more spooky than we originally thought.

Tuesday

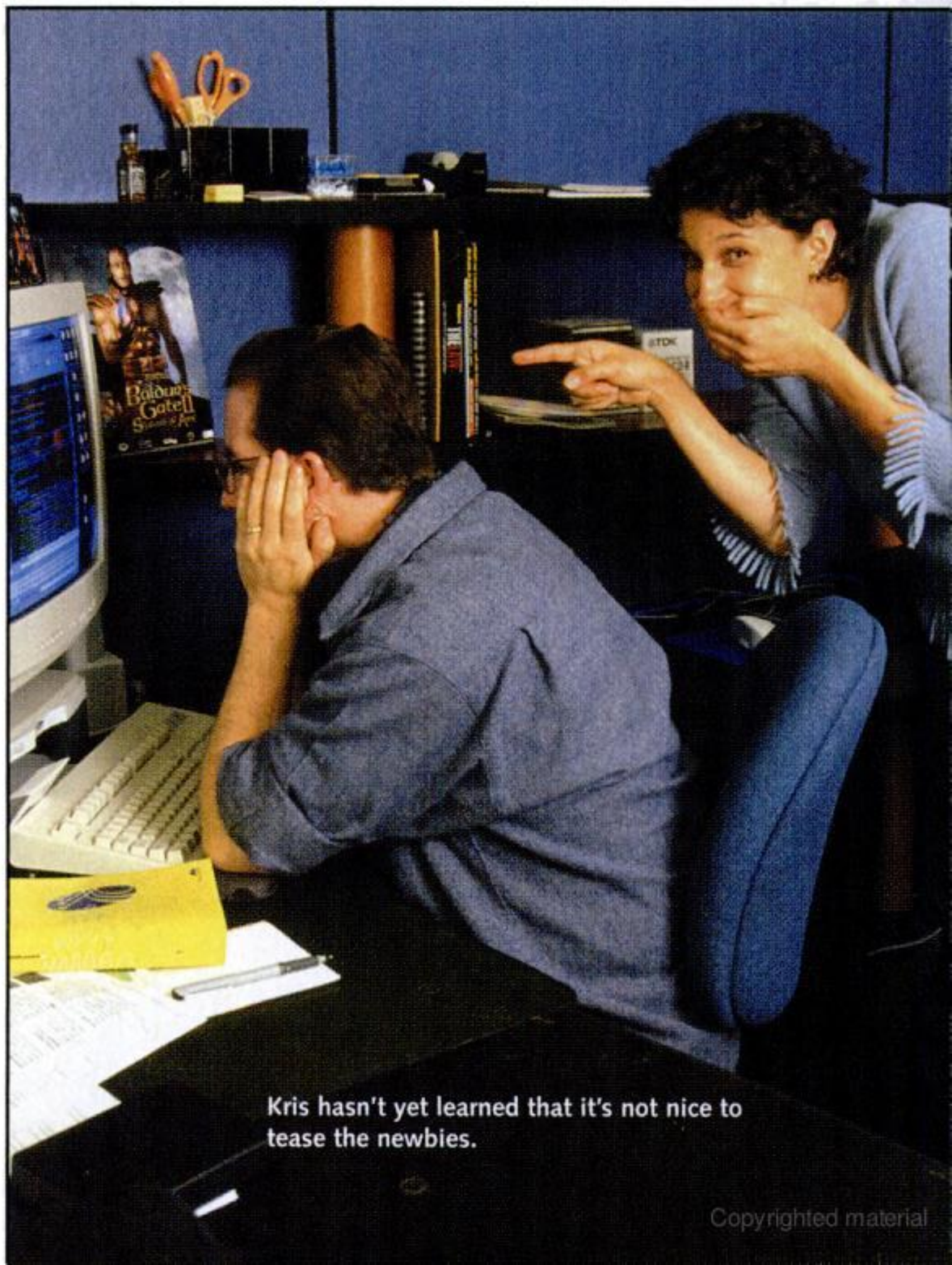
The Prankster: Rob Pratt, reviews editor

The Prankee: Will Smith, technical editor

The Put-On: Turns out Rob is a cheekier monkey than we realized when we hired him. He engaged Will in a long discussion about "The Simpsons" and promised that he'd bring Will a selection of especially funny "Simpsons" sound clips. All the while, Rob was secretly planning to create a fake folder on Will's desktop and name it "Simpsons and Pie," ensuring that Will—who really never talks about anything but "The Simpsons" and pie—would practically break his own neck in an effort to see what was in the folder.

While Will was squirreled away in the Lab doing some benchmarking, Rob commandeered Will's PC, entered DOS, and typed (without the quotes) "cd \windows\desktop", landing himself in the Desktop directory. Then he typed (without the quotes) "MD Simpsons and Pie"—but where the spaces are, he held down the ALT key and typed 255 on the keypad (using not the numbers above the letters, but those on the keypad). ALT + 255 is an old ASCII code that Windows doesn't recognize, so that each time Will tried to click the folder to open it, he got an error message telling him the folder didn't exist.

The Fallout: Seeing as Will is a consummate *Maximum PC* prankster, Rob really zinged him. We know for certain that Will knows this trick and has surely played it on others dozens of times, but Rob's excellent setup made all the difference in the world. Will was so frustrated by his inability to get what he thought were all the goodies in the folder, we thought he might cry. OK, we hoped he might cry. But instead, he comforted himself by watching old "Simpsons" episodes on his TiVo and eating a chocolate-chip muffin (the closest thing to pie he had on hand).



Kris hasn't yet learned that it's not nice to tease the newbies.

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PC Pranks

Wednesday

The Prankster: Kristen Salvatore, features editor

The Prankee: Bill McClendon, online editor

The Put-On: It's an oldie but a goodie, and it happens to be Kristen's favorite PC prank. While Bill was off at lunch munching on his PB&J, Kris hit Print Screen to take a screen-shot of his desktop, then opened *MS Paint* and pasted the shot into a new screen. She saved the shot as a .bmp file, then set Bill's desktop wallpaper to that file (done by right-clicking the desktop, choosing Properties, going to the Background tab, and browsing for the file you just saved).

Next, Kris created a new folder on the desktop and named it "New Stuff" (a name so innocuous, no one would ever think to open it). Then she highlighted every icon on the desktop and put it in the New Stuff folder. What's left? Desktop wallpaper that looks like an active desktop full of folders. But guess what? It's not active! Ha!

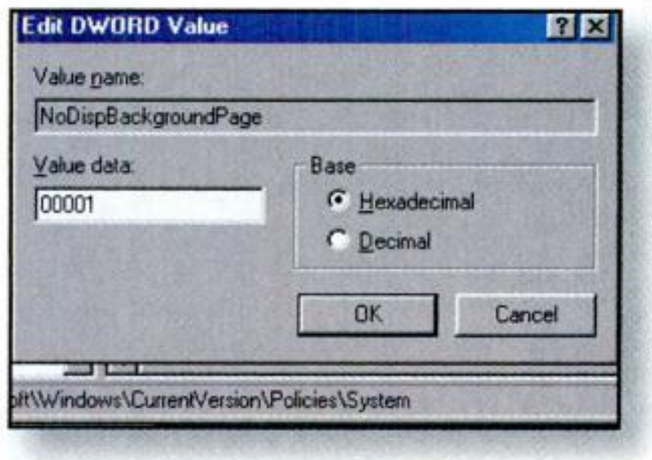
The Fallout: Oh, Bill, you'll have to be a much tougher cookie if you're going to survive here at *Maximum PC*! After about 15 minutes of futile folder-clicking and four reboots—observed with delight by the staff, including Kristen, who did a victory dance behind poor Bill's chair—Bill declared that he was going to call IT for their assistance. Good thing the IT Department is located close to our editorial offices. Kris had just enough time to sprint over to IT and intercept the phone call so they could play along!

Thursday

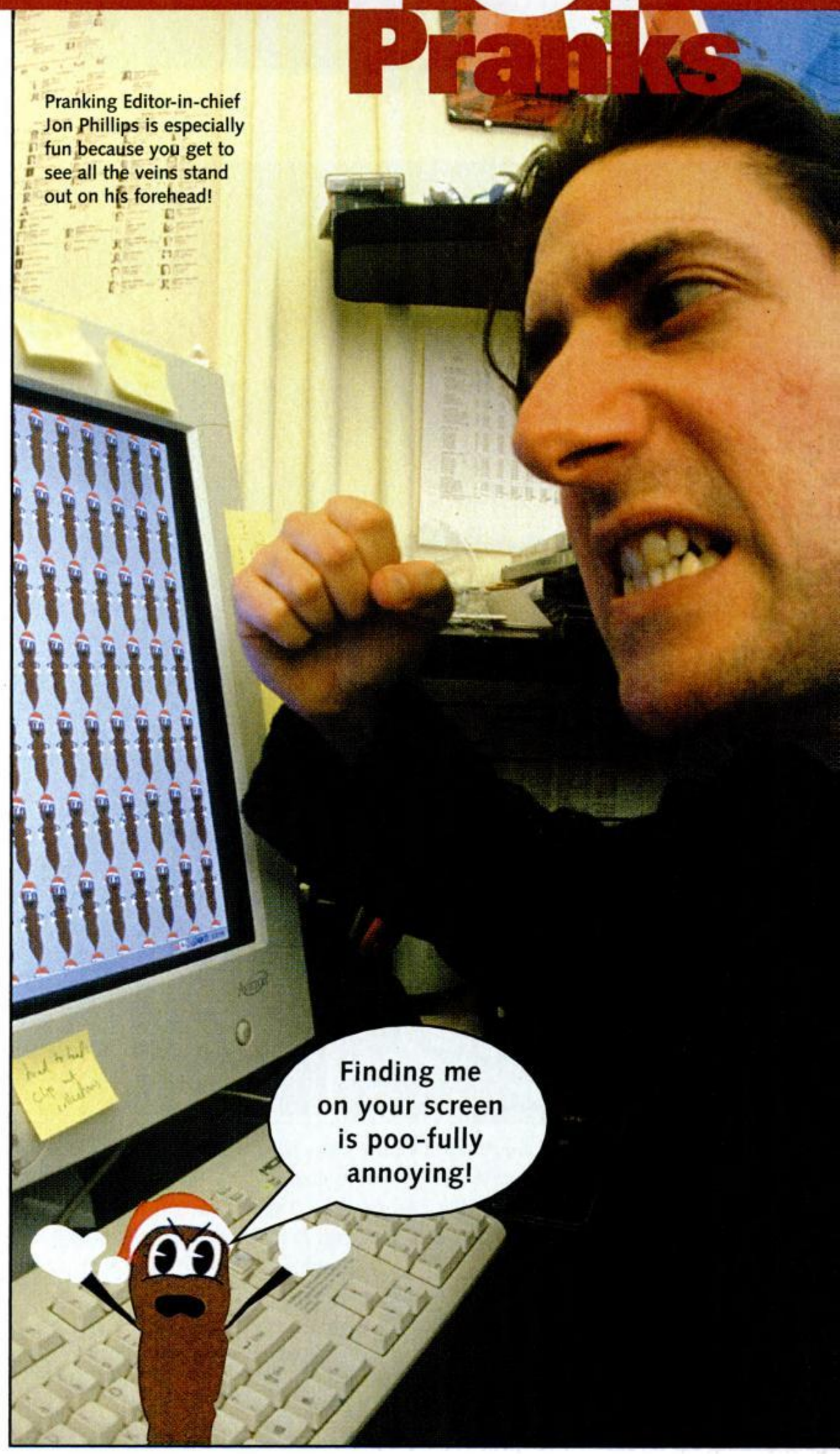
The Prankster: Logan Decker, associate editor

The Prankee: Jon Phillips, editor-in-chief

The Put-On: Logan decided to display his Registry hacking abilities with this little trick. After changing Jon's desktop background to a less-than-desireable repeating icon (at least as far as Jon was concerned), Logan entered the Registry by clicking Start>Run and typing REGEDIT. He made his way to KEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\Policies\System (he actually had to create a key called System) and right-clicked it to create a new DWORD Value. He named that value "NoDispBackgroundPage" then right-clicked that value to modify it and set the decimal value to 00000001. And what does all that do? It removes the Background tab from the Display Properties. You know, the tab that allows you to change your desktop wallpaper after someone has changed it to a picture that you really hate? Yeah, that one.



The Fallout: If there's one thing Jon dislikes, it's scatological humor (and really, who can blame him?). If there's another thing he hates, it's someone touching his stuff. So Logan really went for broke when he changed Jon's desktop wallpaper to a picture of Mister Hanky the Christmas Poo from "South Park." The picture itself elicited an immediate response from Jon—namely, that if anyone touched his computer again, they'd spend the next year cleaning the Lab and buying him hot dogs for lunch—but didn't especially raise his ire. After all, it was just



Pranking Editor-in-chief Jon Phillips is especially fun because you get to see all the veins stand out on his forehead!

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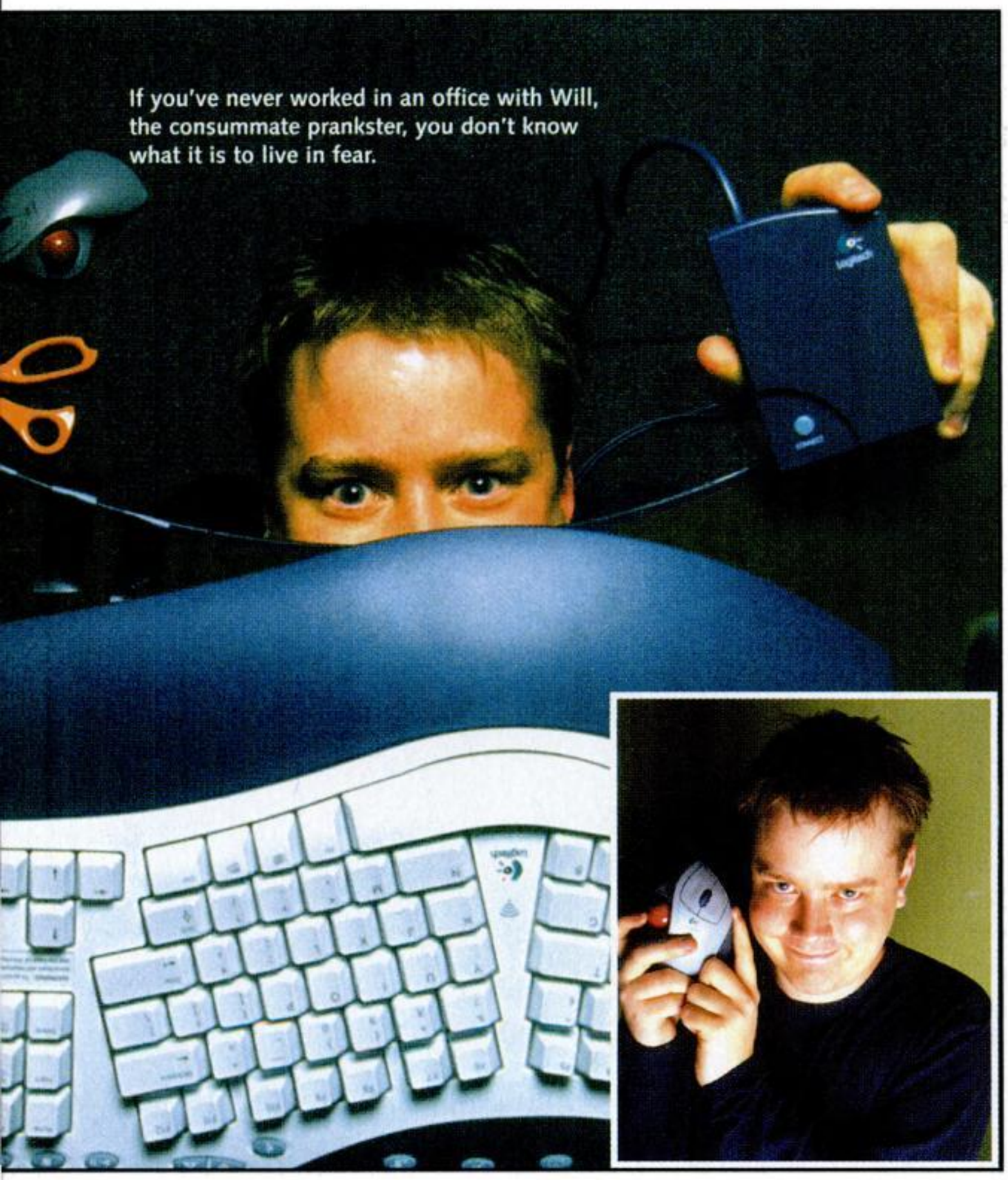
PC Pranks



a matter of entering Display properties and getting rid of the picture, right? Wrong-o. To his credit, the Chief knew immediately that he'd been had and didn't spend too much time futzing around in his bastardized Display Properties. Instead, he just opened up a *Word* document and began drawing up plans for young Logan's fate. In any case, we salute Logan's display of cojones by pulling a prank on El Jefe and wish him the best of luck in his future endeavors. (For the record, to bring the Display Properties window back, go back into Regedit, make your way back to that key, and change the value to 0.)

Friday

The Prankster: Will Smith, technical editor, assisted by Katherine Stevenson, managing editor

The Prankee: Rob Pratt, reviews editor

The Put-On: Will got his hot little hands on a wireless USB trackball, plugged the trackball's wireless receiver into Rob's PC, and taped the receiver to the underside of Rob's desk where it was out of sight. He kept the trackball at his own desk.

Will doesn't sit within sight of Rob's computer, but Katherine does. Each time Rob reached for his mouse, Katherine gave Will a hand signal and Will spun the trackball, sending Rob's mouse on a seemingly unprompted wild ride around his screen. (A side note: If your prankee is using a USB mouse, be sure you plug the wireless trackball into the USB port closest to the motherboard so it's considered the primary device.)

The Fallout: Rob's a pretty easygoing guy who likes to take care of business without causing anyone any hassle. We have to assume that this is why, after adjusting every possible mouse setting in his Control Panel with no success, he didn't just yank his mouse out of his PC and hurl it through the nearest window. In fact, he remained so calm in the face of his mouse's absurd behavior that Will and Katherine accidentally gave themselves up—they were laughing too hard at their own antics. Unfortunately for Rob, this means they have vowed not to rest until they come up with a prank that really makes Rob squirm. In the meantime, the rest of us are quite enjoying watching Rob titptoe around the office, waiting for the other shoe to drop—his constant state of fear is hilarious! Thanks, Rob!

And the Screws Continue...

Think these are the only antics that have made their way into the *Maximum PC* office? Not likely. Below are a few others we've employed, against ourselves and other members of the Imagine Media family. You'll note that we are not at all ashamed to go as completely low-tech as rearranging the keys on someone's keyboard—it may not display much technical prowess, but damn, is it funny!

- Move or remove the Start button by clicking twice on it (until it's surrounded by a dotted line), then pressing ALT and the hyphen key at the same time.

- Enter the Mouse applet in the Control Panel and up the double-click speed on the mouse to maximum.

- On PCs that use the standard Microsoft mouse drivers, enter the Mouse applet and change the mouse orientation from right-handed to left-handed. Or, reverse the properties of the right and left mouse buttons.

- Remove Shut Down from the Start Menu by entering REGEDIT, browsing to HKCU\Software\Microsoft\Windows\CurrentVersion\Policies\Explorer, creating a key called (without the quotes) "NoClose", and setting its value to 1. You can do the same with Run ("NoRun").

- Take the mouse ball out of the mouse, or cover the mouse ball with a piece of tape.

- Obtain a fake Blue Screen of Death screensaver (you can find it online) and install it on co-workers' computers. When they figure out what you've done and delete it, reinstall it—over and over and over.

- Subscribe co-workers to the International Male catalogue using their work address (not PC-related, but highly effective).

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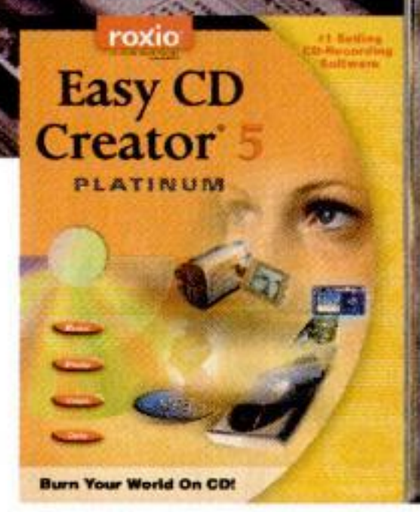

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GETTING TO KNOW YOUR

Digital CAMERA

Wary of buying your next digi cam? Intimidated by the one that's sitting in your drawer? Then it's time to cast aside your ignorance and become fully versed in how digital cameras work. We'll tell you which features suck and which features rock, and forecast the future of the industry's coolest offerings.

EVERYTHING NEW IS OLD AGAIN

Digital cameras operate on all the same principles as their film-based ancestors and share nearly all the same major components. Light enters the camera through a lens assembly (which is usually comprised of multiple elements), and the light image is focused onto a plane. In traditional photography, the plane is silver-halide film. In digital photography, the plane is an electronic sensor that translates the image into a signal that's recorded as a digital file.

Digital photography actually requires two separate components to accomplish its task. The sensor circuitry sits on the plane where film would be found in a traditional camera, but the sensor doesn't store the image the way film would. Instead, sensors must pass the image along to storage media, most commonly *removable flash media* such as Compact Flash or SmartMedia.

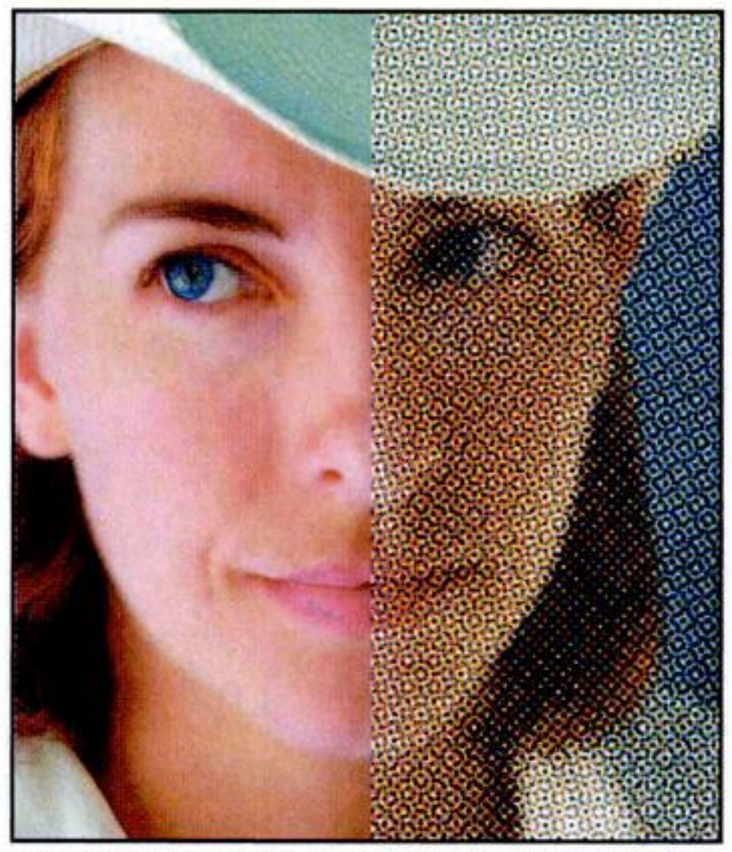
An advantage of this digital system is that the content of the electronic media can be easily archived, allowing the media to be used again and again. But this is also a disadvantage. Because electronic media is relatively expensive (at least when compared to the cost of traditional film), it's necessary to offload images in order to archive them. This requires yet a third system—usually a PC with some form of removable media reader attached—to accomplish the same thing a humble roll of film and some pocket change can manage.

Of course, digital pics themselves do have their own dramatic advantages. Their latent images don't require a timely and complicated chemical process to be developed, and images can be duplicated (or deleted) at will with no esoteric equipment or knowledge. Also, images can be easily modified with a broad spectrum of common software—and you can do all of this at home with no expenses beyond an initial investment in hardware and software.

RUNNING THE NUMBERS

Any printed image, be it traditional or digital, is made up of discrete *dots* of varying size and color. While they may not be visible to the naked eye, especially in the case of the fine grain in film images, these dots can be seen under magnification. Just as the images printed in this magazine are comprised of thousands and thousands of dots of just four colors arranged in elaborate arrays, a full-color 8x10 digital image is made up of millions of color dots.

The resolution of a print can be calculated in much the same way that other imaging resolutions are measured: in *dots per inch* (DPI). This simple method measures the number of color dots found in each inch of an image. Printers are gauged on the DPI of their output, but a computer screen's DPI varies according to the size of the monitor and the resolution setting of the videocard. For example, a 14-inch monitor would pack a 1024x768 image onscreen at a density of 95dpi. A 21-inch monitor would render the



Even the continuous-tone images reproduced in this magazine are made up of scads of tiny dots of color. Amazingly, all the colors reproduced are composites of only three colors and black ink, as illustrated by the right side of this image.

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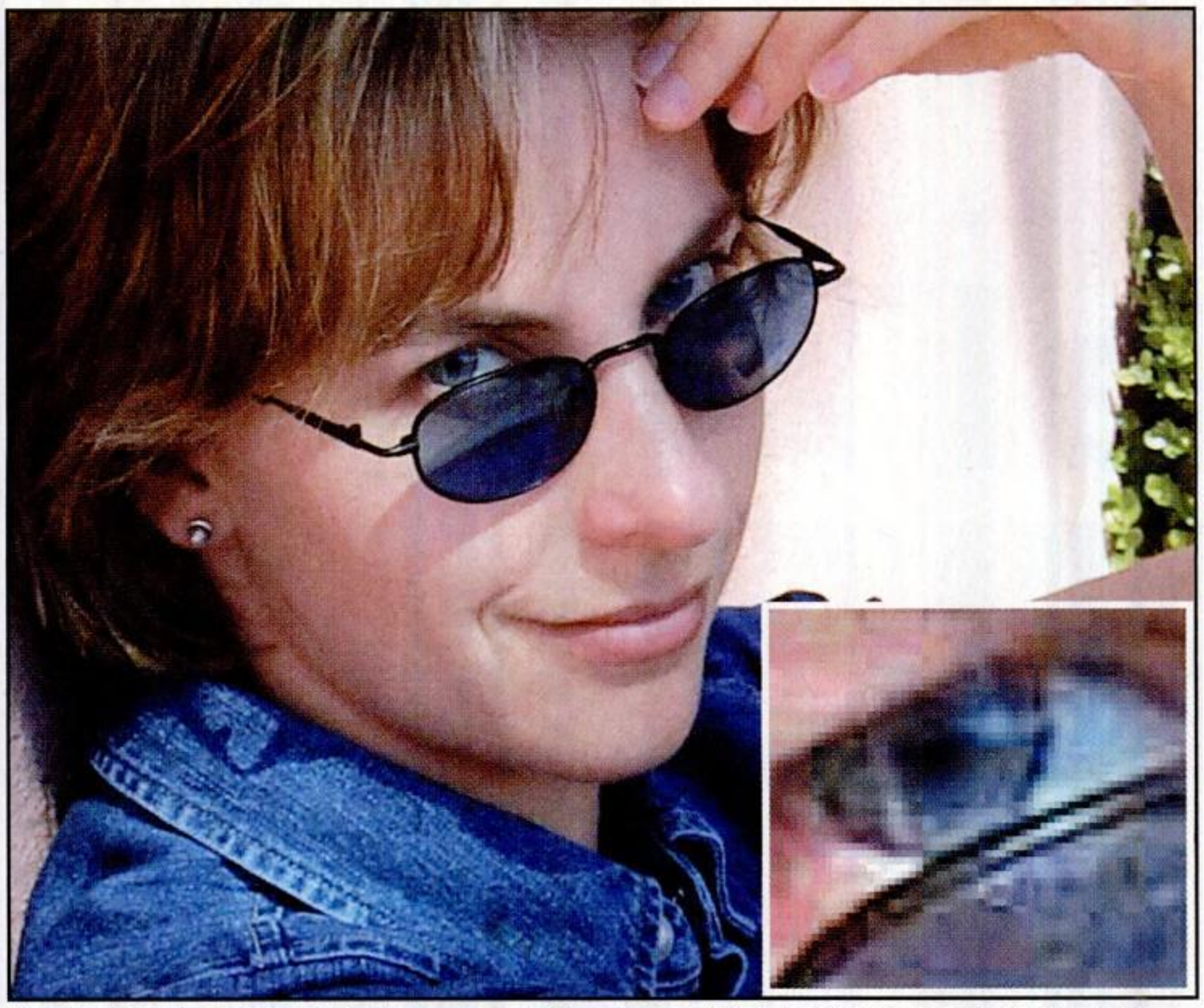


Even the highest-resolution digital images are actually made up of discrete dots known as pixels. This fact is frequently obscured, but a simple zoom-in reveals the truth.

same 1024x768 image onscreen at only 65dpi. This illustrates the inextricable relationship between DPI and *pixels*. This principle can be one of the most confusing fundamentals of digital imaging.

Pixels (short for "picture elements") are the discrete points of data that comprise a digital image. Think back to the classic board game Battleship. Each square on the grid could be precisely identified by a two-character code (for example, B-2 or C-5). Digital images use a similar convention. Every digital image is essentially a grid, and each square in the grid is uniquely identified as a pixel. The resulting file is called a *bit-map*. All digital images are made up of a fixed number of pixels, and these pixels can be displayed at a variable DPI, either in print or onscreen.

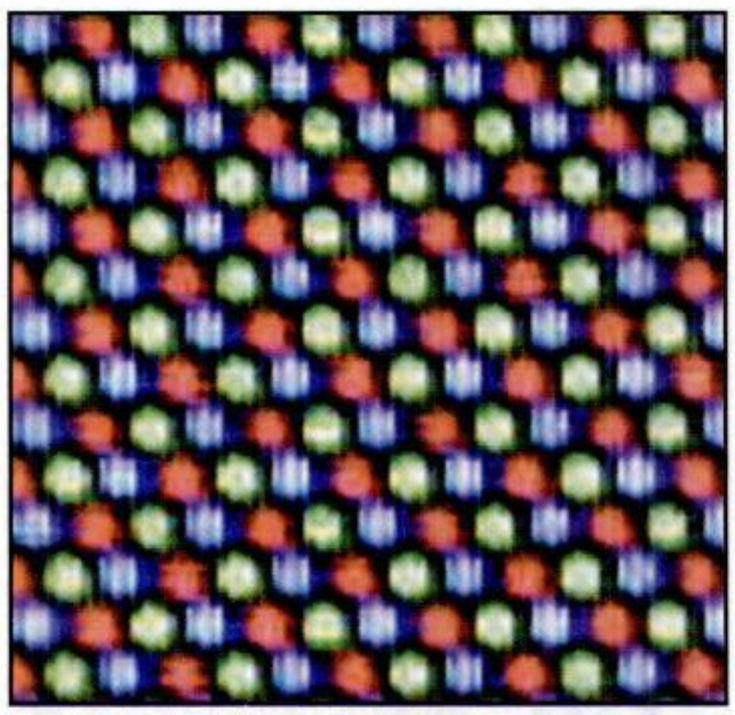
MEGAPIXELS EXPLAINED

OK, now that you're versed in what comprises digital images, it's time to learn about how the images are actually produced. Your digital camera's sensor is made of individual *photosites*, and each photosite is activated by the light that passes through the camera's lens. The sensor converts this analog light image into an electrical signal, which is then converted into a digital file comprised of fixed pixels of image data.

Most digital cameras list a *megapixel* rating for the sensor. This rating is determined by multiplying the number of horizontal pixels the sensor produces by the number of vertical pixels. A sensor that captures images at a native 1280x960 resolution is a 1.2-megapixel sensor (1,280x960=1,228,800 and "mega" means "one million").

You might also have heard the term *interpolation*. This is the process of increasing the amount of file data in an image and thus the resolution of the image itself. Essentially, the camera surveys the color properties of existing pixels and then uses an interpolation algorithm to calculate the color properties of new pixels that will surround the originals.

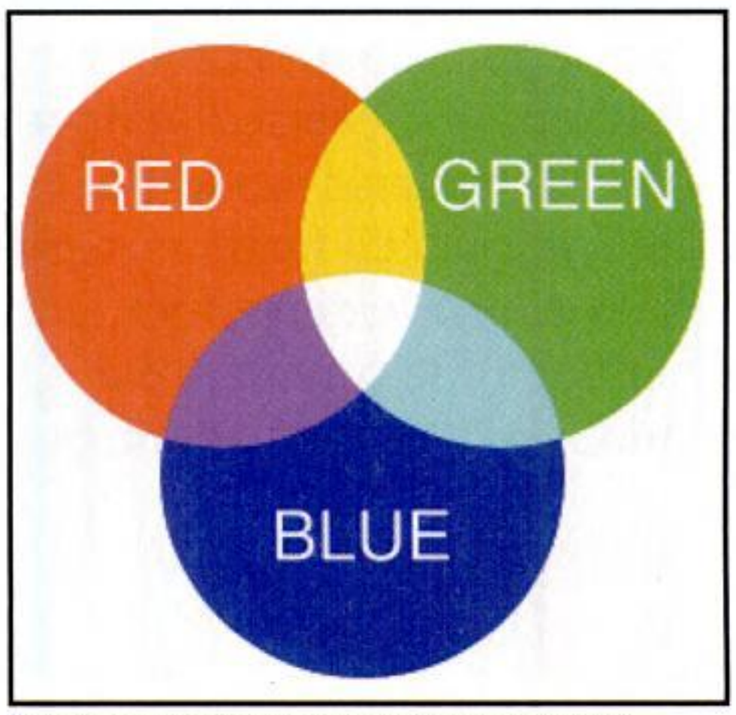
Unfortunately, some camera manufacturers attempt to atone for their low-resolution sensors by performing "upward-interpolation" on the fly during the image-capture process. For example, a sensor that's mechanically limited to 1600x1200 images will use interpolation to "guess" at how the image would look if it were captured at 2080x1560. This can lead to trouble. Image quality invariably suffers when these manipulations are pushed too far.



This is what you see when you zoom in on a computer screen—a whole mess of red, green, and blue dots of light that combine to create the color display we're all accustomed to.

Interpolation also comes into play with *compression*. Typically, all digital images are compressed with the *Joint Photographic Experts Group* (JPEG) algorithm before being written to storage. This compression format is *lossy*, which means that image data is lost in the process and quality can be degraded as a result. That stated, the tradeoff between image quality and file size is negligible. The image defects introduced by compression are rarely ever perceptible, and the compression process yields amazing file size savings. That's why JPEG is a near-universal standard.

One thing to note about JPEG: The algorithm is variable and can be applied at various strengths. As greater compression is applied, more *artifacts* appear. Artifacts are areas in the image where the compression algorithm has incorrectly calculated the data for an interpolated pixel. Artifacts appear as blocky sections of slightly mismatched color.



If you want to understand additive color, you'll have to ditch everything you learned during years of finger-painting.

TRIPPING ON THE LIGHT FANTASTIC

Ask someone how to make the color green and he'll draw from his finger-painting experience in elementary school and suggest mixing blue and yellow together. While this approach works with paint, it doesn't work with light. Shining a blue spotlight and a yellow spotlight on a white wall doesn't produce a green spot. Meanwhile, combining a green light and a red light *will* produce a yellow spot. Go figure.

Two opposing color mechanics are at

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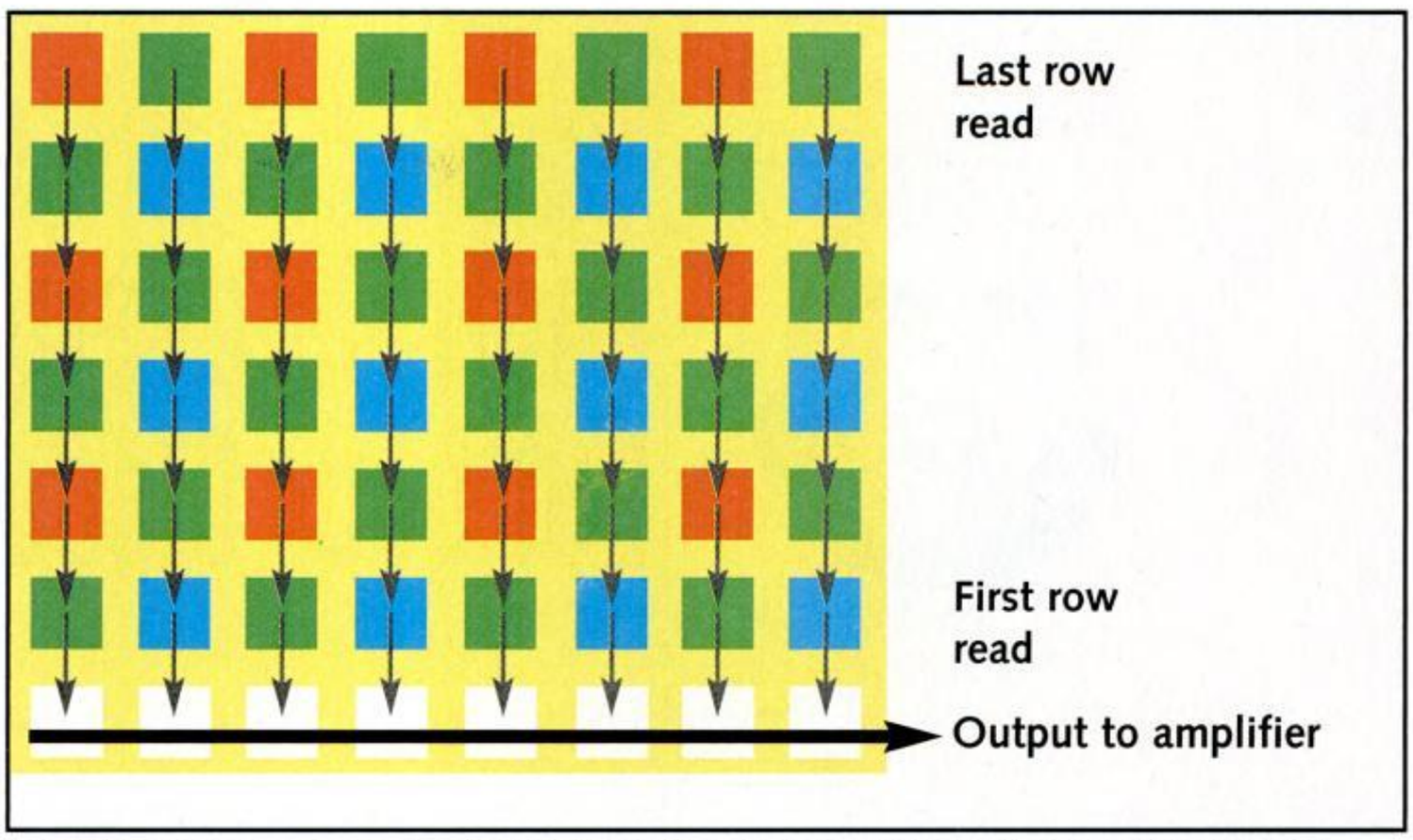
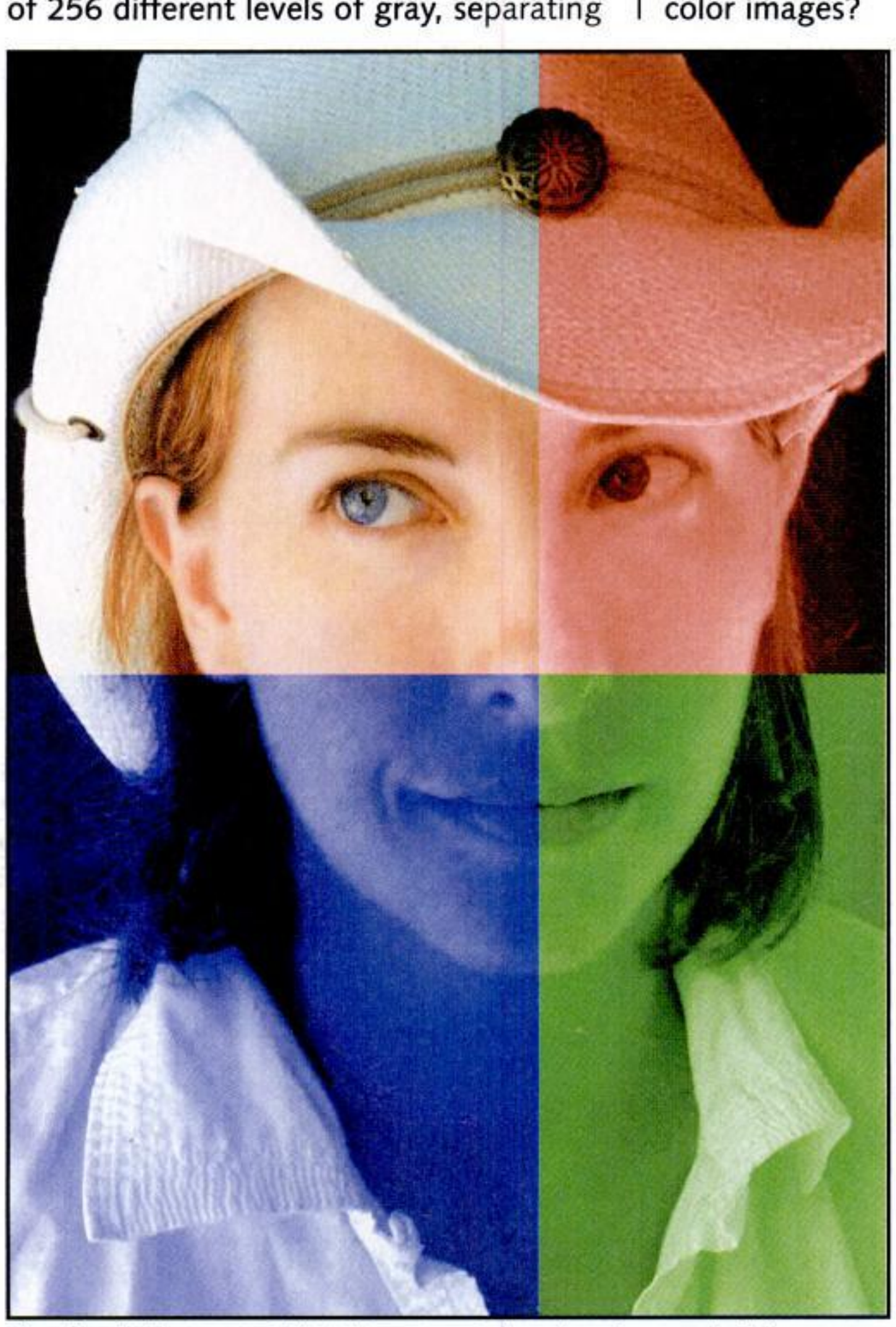
work here. The one that more people are familiar with is the *subtractive* color system. This works with any reflective source, including paint. The other system is known as the *additive* color system, and applies to *transmissive* sources, such as light beams. A photograph reproduced in this magazine employs the subtractive system to combine four colors of ink (cyan, magenta, yellow, and black, also know as CMYK) to create the full-spectrum images you see here. Your computer monitor, on the other hand, works on the principle of additive color, combining clusters of only three colors (red, green, and blue, also known as RGB) to create the full-spectrum images you see on the screen.

Knowing that the light recorded by a digital camera is actually made up of various combinations of red, green, and blue light helps us understand how the sensor captures an image. The dirty little secret is: *There's no such thing as a color camera sensor.*

Each photosite on the sensor of your digital camera can really only distinguish the *intensity* of light striking it. It then assigns that pixel a corresponding gray level from a scale of possible brightnesses. In an 8-bit image, the scale is made up of 256 different levels of gray, separating complete white and complete black. In a 24-bit image, that scale includes thousands of grays, and in a 32-bit image, the scale includes millions of grays. So how does the digital camera record color images?



The CCD sensor common to most of the better digital cameras today works through a fairly complex process of capturing rows of data, writing that data to a register, capturing a new row of data, then joining the new data to the previous data. This is repeated until the image is completely recorded and sent to an image buffer.



The dirty little secret of digital imaging is that there's no such thing as a color image. The color image files with which we're familiar are actually composites of three grayscale images that have been captured through filters that ultimately define color.

Simple. It actually takes three separate pictures, one for each of the major additive colors. Some cameras, especially digital video camcorders, employ a separate sensor for each color, but most still cameras employ filters. By filtering out all light from the other two colors (for example, a red filter removes all green and blue light from an image), only grayscale intensities of the target color are recorded. Data from each of these red, green, and blue images is recorded in a separate corresponding *channel*. When the three channels are later combined and each grayscale image is displayed in its target hue (for example, the blue channel would consist of various shades of blue separating absolute white from a solid blue), the resulting image is the familiar color image we're accustomed to seeing onscreen.

THE C-WORDS

The original (and most popular) light sensor used in digital cameras is known as a *charge-coupled device* (CCD). CCD sensors are defined by the way they handle the data they generate. In a nutshell, they pass the charge generated by the exposure process to a row-by-row *register*. Subsequent rows write to the same register and couple with previous image data. Once the final row has sent its data, the register is cleared to a *memory buffer* that writes to the storage media. Early digital cameras had just enough buffer memory to hold the current image during write-to-storage. Today's better cameras have much more memory, allowing multiple frames to be exposed within a single second.

Given the complexity of their design, the cost of manufacturing CCDs is relatively high. And because the technology requires a constant charge to move and assemble data on the chip, the electrical requirements are high. Enter *CMOS* chips. The Complementary Metal Oxide Semiconductor process is used to manufacture most processors used in modern technology. Intel's CPU processor family uses the CMOS process of etching circuitry into the silicon wafer. The ubiquity of this technology results in much lower costs (due to economies of scale in the manufacturing process), as well as much higher yields. CMOS-based sensors cost less than one-third the price of comparable CCD sensors.

CMOS photosites include controller circuitry because they're not dedicated to absorbing light (unlike CCD photosites, which are dedicated to the light-gathering process). This results in reduced photosite sensitivity. CMOS sensors require more

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Controls everything but your blood pressure

Enter the newest nonstop heart-pounding gaming frenzy, the Nostromo n45 from Belkin, the way in, the way to win, the mega-fast ultra-domination blood-pumping danger controller-evader that with enter – esc – mouse buttons flips you instantly into navigating Windows and drives the mouse cursor from the directional pad, n45 with its 13 programmable buttons, 70 (!) programmable functions, dual analog sticks and USB compatibility, you'll know exactly what you'll do next and be stunned when you do it, the Nostromo n45 GamePad—and the entire line of precision gaming tools from Belkin—gets you in control and breathless

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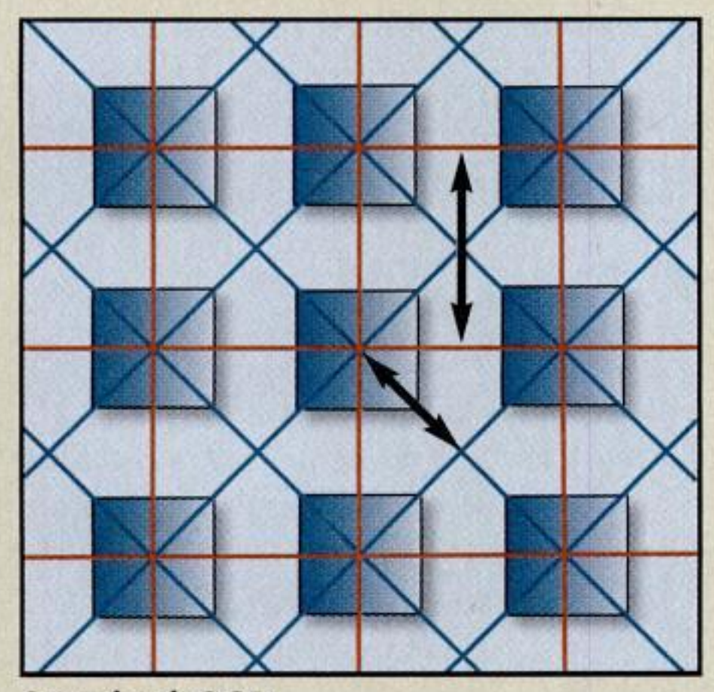
illumination for image exposure. Early CMOS cameras struggled (and sometimes outright failed) in low-light shooting situations. But with the advent of new chip designs that minimize the control circuitry, as well as micro-lenses that focus existing light onto the exposed photosites, the intrinsic deficiencies of CMOS have been somewhat mitigated.

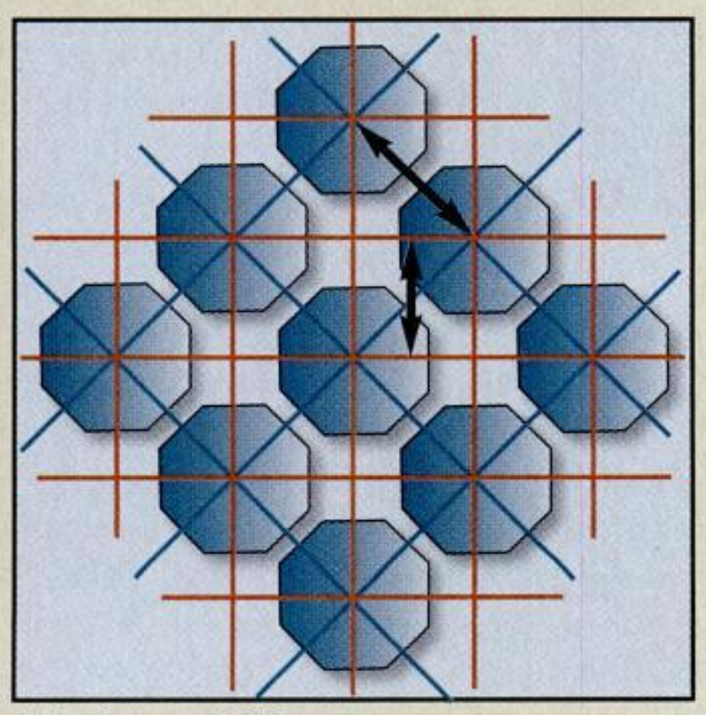
One major upside of the CMOS process is its versatility. While more than one function could conceivably be performed on a single CCD chip, cost constraints prohibit such consolidation.

PACKING IN MORE PIXELS

FujiFilm's new Super CCD sensor uses octagonal photosites arranged in a honeycomb pattern to deliver more data from a smaller sensor. But these rounder pixels still need to fit in a square hole when actually written to a recognizable bit-map file format, so a level of interpolation is required. In our experience, this compromise tends to offset any advantages of the design. Nonetheless, it does set a precedent for creative solutions beyond the mad rush for more and more megapixels.



Standard CCD



Fuji Super CCD

The new breed of dual-mode digital cameras pull double duty as web cams, full-motion camcorders, and even MP3 players.

On the other hand, low-cost CMOS-based chips are frequently multi-function and include onboard image stabilization, on-the-fly compression, and support for motion-video capture. All of this parallel activity, along with the processing required to clean the digital "noise" (interference) out of the busy chips, does incur a performance hit. But even this can be offset with the addition of a common *Digital Signal Processor* (DSP) chip.

Finally, the CMOS-based sensor requires vastly less power than its CCD counterpart, making it ideal for portable applications such as the digital camera.

THE FUTURE'S BRIGHT

Most experts agree that the long-term future for digital photography lies with inexpensive, versatile, CMOS-based cameras. As CMOS image performance continues to improve, expect to see smaller and smaller cameras that are capable of better and better image quality.

Examples of the svelte shape of things to come can be found in SmaL Technologies' credit-card-sized **Ultra-Pocket** CMOS camera, Casio's **WQV-1** wrist camera, Sony's **VAIO Picturebook** notebook PC (which features a digital camera capable of both still and motion capture), and the **EyeModule 2** Springboard module for the Visor PDA. Kodak's **PalmPix** adds much of the same functionality (and just another inch of formfactor) to standard Palm PDAs for less than $100.

In addition to its PDA camera, Kodak recently announced the **mc3**, which is the size of a Palm PDA and combines a 0.3-megapixel digital camera, a QuickTime video camera, and a stereo MP3 player. Images and MP3s can be transferred to a PC via removable media or a cradle. Combining video and still images in an even more ambitious manner is Canon's **GL-1**, which puts pro features within consumer reach. And the next generation of dual-mode cameras work as both web cams for continuously steaming video online and as traditional digital cameras, capturing and storing both still and motion images locally. D-Link's **DSC-350** is a perfect example of this new trend.

MORE MEGAPIXELS

Of course, the high-end enthusiast market will sport even more digital cameras that push the megapixel envelope (and they won't include all that MP3 funny business). Major players in the digital camera space are projecting 4-megapixel models before year's end, and at least one manufacturer is privately talking about a 5-megapixel camera with an interchangeable lens system for the prosumer segment late this year or early next year.

But with today's 3-megapixel cameras, print output of up to 8 x 10 inches is virtually indistinguishable from film, so expect demand for these more expensive offerings to be mixed. Instead, the megapixel numbers game will be offset with long-sought features, such as greater manual exposure controls and interchangeable lens systems. Look forward to our July 2001 issue for more information on the exploding digital imaging phenomenon. ✹

—Brad Dosland

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ASK THE DOCTOR

Symptom | Diagnosis | Cure

Even the burliest of PCs comes down with a bug every now and then. That's when you need to call The Doctor and get a diagnosis that'll have you up and running in no time. Send your symptoms to: **doctor@maximumpc.com**

This month:

- Voltage Overclocking
- Floppy Removal
- Hard Drive Not Big Enough
- Closing Program

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Voltage Overclocking

I had great success overclocking my 450MHz Pentium II and now I'm trying to repeat that success with my latest machine. I have a 733MHz Coppermine on a Soyo SY-6VBA+133 motherboard. It will allow me to increase the voltage to the proc in 1-percent increments. Is this necessary for stable overclocking? I never had to do this with the Pentium II, but just increasing the frontside bus on the P-III doesn't seem to yield me a stable configuration. I have more than adequate cooling, so heat isn't a problem. Any suggestions?

—William Knox

Voltage mods will make a processor more stable—sometimes. Take early Pentium IIIs; they had a voltage of 1.65. The closer the procs were clocked to 1GHz, the more voltage they required (1GHz P-IIIs have a voltage of 1.75). The increased voltage keeps the proc more stable by giving it more voltage in small increments until it stays stable.

You can also look for more insight at Overclockers.com. The site features a database that reveals many different CPU configurations. This should give you a basic roadmap for your own overclocking/voltage strategies.

Floppy Removal

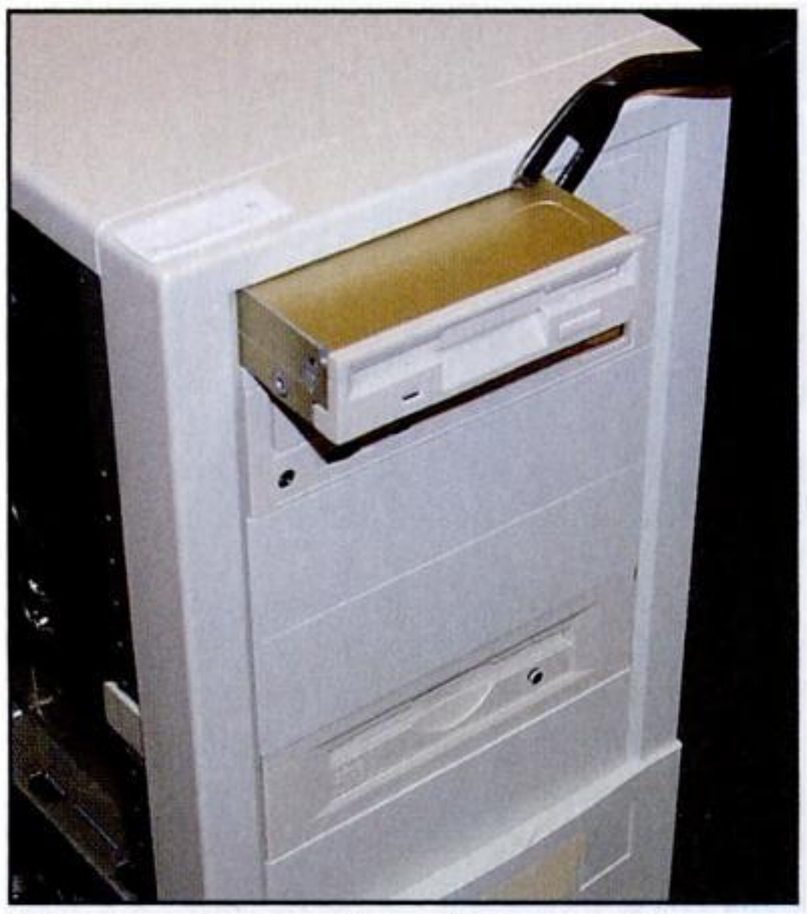
This must be an old issue, but I have found nothing on it. How does one set up the ZIP 100 ATAPI as a boot alternate drive? I have no floppy. This is on an ABIT VP6, AWARD Modular BIOS v6.00PG.

— Michael

> **"The closer the procs were clocked to 1GHz, the more voltage they required."**

You'll need to go into your motherboard's BIOS and configure your boot order. In Abit's Soft Menu III (the BIOS), you'll need to go into the Advanced BIOS Feature settings and select LS/ZIP as your First Boot Device. From there, you can set up your boot order in whatever way you see fit. The Doctor's suggested boot order for your system is LS/ZIP, CDROM, ATA100, HDD-0.

Abit suggests setting the "Report No FDD for Win95" toggle to "Yes" when using Windows 95 and 98 without a floppy drive. You'll need to look



When you remove your floppy from your system, you'll need to modify your BIOS.

in your motherboard's manual to get a more accurate idea of what's needed if you want to fool around with different motherboards. If you're not comfortable with the technical procedures described here, you can have a friend help you, or you can purchase a computer from Apple.

Hard Drive Not Big Enough

I seem to have a problem with my 45GB IBM 75GXP. No matter what I do, I can't seem to get the drive to be larger than around 42.8GB. I paid for a 45GB drive and would really like the extra 3GB for storage of MP3s and games. I've tried reformatting several times and still can't seem to get this drive to be any larger. Is IBM mismarking its drives?

—M. Jordan

Welcome to the wonderful world of slack space. The issue is a numerical faux pas. What happens is that your drive is measured in base-10 numerals, where 1GB=1000MB, 1MB=1000KB, and so on. This means 45GB=45,000,000,000 bytes. In actuality, the drive should be measured in base-1024 numerals, where 1GB=1024MB, 1MB=1024KB, and so on. This would mean that a true base-1024 45GB drive would equal 48,318,382,080 bytes.

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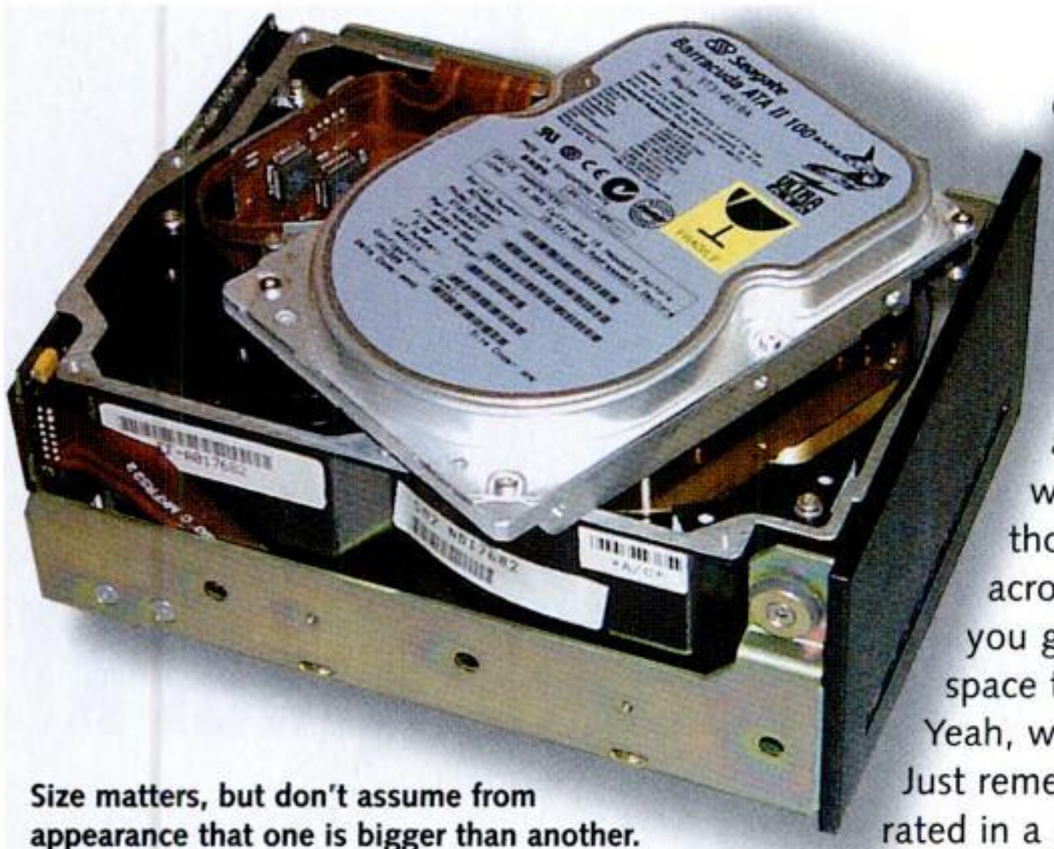

Size matters, but don't assume from appearance that one is bigger than another. This big drive holds just 9GB.

But, as you've seen, this is not the case. Your drive is approximately 45GB, give or take a GB. You've "lost" some space simply because of a discrepancy between the marketing world and the real world. Also, you lose some space on the drive when you format the drive.

Base-10 numbering is a holdover from the old days when it was easier to just label a 1GB drive as a "1GB drive." After all, the consumer only "lost" 48MB in the process. That's not much when you think about it, right? But when you add up all those 48MB chunks across a "45GB" drive, you get 2.2GBs of actual space that's been "lost." Yeah, we know it's confusing. Just remember that a drive rated in a base-10 scale will always be a little bit smaller than the advertised specs.

Closing Programs

I have a 500MHz Pentium III with 256MB of RAM on a Soyo SY-6VBA 133 motherboard running Win98 SE. My problem is this: I was scanning a color picture at 600dpi with my ScanMaker E6 to import the picture into Microsoft *Photo Editor*. The software displayed an error message telling me to close all other programs and try again. The picture I was scanning was about 65MB. I was able to scan the picture, but MaxMem was going crazy, showing a dangerously low amount of memory left available during the process. After an "aggressive" clean-up, I am showing about 179MB available with only *Outlook* open.

> **"All of those programs running in the background are chewing up processor cycles."**

When looking at my System Properties, I'm told my system is "configured for optimal performance". In the background I have *Norton Task Scheduler, Norton AntiVirus, Direct CD, Hot Sync,* and *Diamond Video Desktop* running. What gives?

—Luc Trocme

Even though you're not running any major applications (such as games and other imaging editing apps) in the background, you're still nickel-and-diming your memory resources. All of those programs you mentioned are not only chewing up processor cycles, but are also eating into your precious memory allocation, be it physical or virtual.

Your scanning dilemma is all too common. Some programs need total control of the system to run properly. A disk defrag utility, for example, will want 100 percent of the system's attention. This is why you need to shut down everything, including background applications, when running certain programs.

Now, certain defragging programs don't have this problem and will "work around" other programs, but this isn't always the case. Just remember to shut down everything when doing defrags and certain other operations, such as scanning large images. Besides, when a defragger is doing its thing, it's actually rearranging the placement of data on your hard drive. Would you like to chance a screw-up by having a tiny app like *Direct CD* running in the background and possibly futzing up your data? Nope, and neither would the Doctor.

READERS SHARE THEIR HOME REMEDIES second opinions

Boggling Boot Menu

In the March 01 issue, you said that in order to dual-boot Win98 and Win2K installed on separate devices, the boot device would need to be changed in the BIOS because Win2K would load its boot loader on the RAID set. However, this isn't the case. If the machine is set up with the single drive as C:\ for Win98 to boot (a Win98 requirement), and Win2K is installed on the RAID set, it will put its boot loader on the single drive and the boot.ini file will point to the RAID set for booting Win2K. At startup, a menu would appear allowing a choice between Win98 and Win2K.

—Phil Van Camp

Good point, Phil. The Doctor admits to bungling the mandatory Windows 98 C:\ drive requirement. Yes, Windows 2000 will place its boot.ini file on the C:\ drive and point to the RAID array. However, we do maintain that Windows 2000 would be happier in the RAID array than Windows 98 would.

Boot-Up Buzz

I have seen on several computers the [virtual device] problem that Eve described (March 01), usually after loading certain software. One quick fix that works 90 percent of the time is this:

Boot up and hit F8 to get the boot menu. At the C:\ prompt type `CD WINDOWS`, then type `EDIT SYSTEM.INI`.

Scroll down until you see the [vcache] header, usually after [mci]. Under this header insert the line: `maxfilecache=6000`. Save and exit, then reboot the PC.

This has something to do with how Windows handles file/memory caching (I don't know the specifics, but you can find them on the net). I have found that this usually happens after installing MS Office (97 or 2000), Novell Client, Groupwise, and *WordPerfect*.

—Aubrey

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REVIEWS

Stepping up to the bench[mark]

I can *too* live up to Josh Norem's legacy. As the new *Maximum PC* reviews editor, I realize that I may never improve upon the way Josh shepherded the reviews pages (and whacked lagging writers with a virtual crook). But I know I can match his prowess in at least one area: I love my kitty just as much as Josh loves his.

My family and friends can tell you that Kissy (that's her name) gets loads of care and attention. She even has her own place at the kitchen table (though she's not allowed to eat at the table—that just wouldn't be proper for a well-behaved puss).

For another clue about my background, check the following pages. My reviewing debut in *Maximum PC* comes with looks at Sonic Foundry's *Sound Forge 5.0* and Klipsch's ProMedia 4.1 speakers. My yen for PC power comes from a need for processor speed to drive my digital audio and MIDI experiments—and to annoy the neighbors with prolonged subwoofer rumbles.

What's next for the *Maximum PC* reviews section? Well, a new generation of hardware demands a new approach to reviews. Check back next month, when we'll unveil a revised set of benchmarks. In the meantime, send me some ideas on how you think *Maximum PC* can benchmark hardware to provide the best information on real-world performance. Send a note to **rpratt@maximumpc.com** with "benchmarks" in the subject line.

—ROB PRATT, REVIEWS EDITOR

Reduce, Reuse, Recycle

Many *Maximum PC* how-to stories require unusual materials, and when we're done with them, we always try to do our part for the environment by recycling. Some of the editors are more clever than others at finding new uses for odd leftovers, as the remnants from this month's paint-your-case feature clearly demonstrate.

Many of us thought that Scott Tarr took the paint-your-case assignment just so he could get a new shade of fingernail lacquer for free.

Rob came up with a great new personal fashion statement—and the rest of the staff was quick to dub him with the new nickname "Ice Ice Baby."

Jon's idea for leftover paint managed to assert both his position as the boss-man and his obsessive zeal for the movie *Titanic*.

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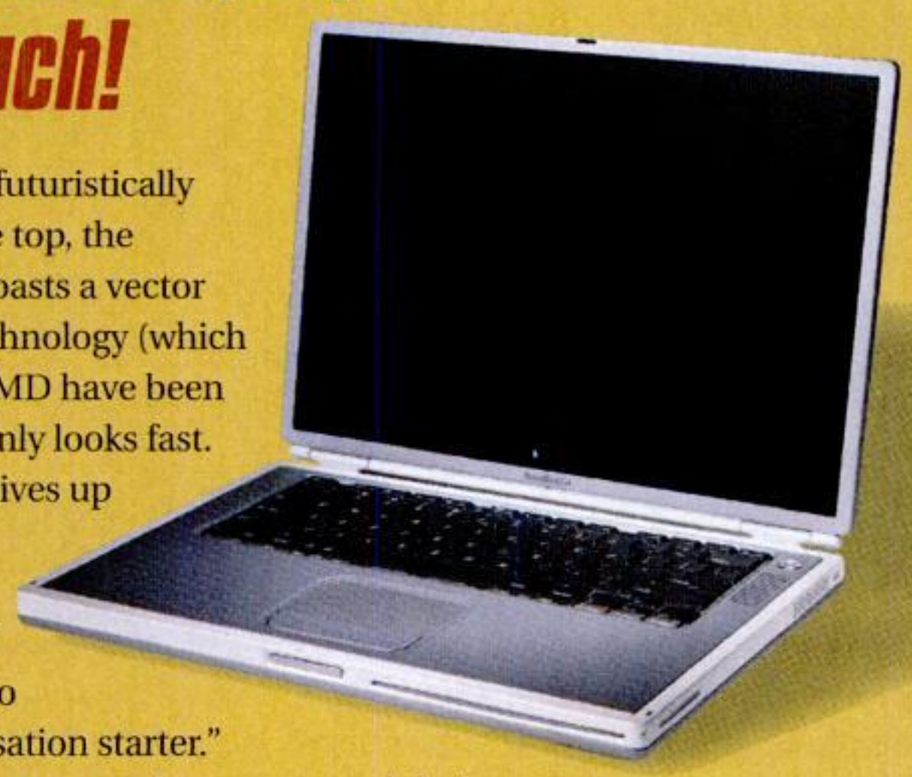
A behind-the-scenes look at the Maximum PC Lab and the gearheads who work in it.

Apple's New Titanium Laptop:

Look, But Don't Touch!



With a sleek, brushed-metal exterior and a futuristically glowing, Olympian-white Apple logo on the top, the 500MHz Velocity Engine-based Titanium boasts a vector processing unit with parallel processing technology (which sounds like the same thing that Intel and AMD have been doing with their SIMD extensions). It certainly looks fast. In our judgment, the Titanium completely lives up to the marketing hype that surrounded its January launch.

"Think of it as a portable design studio," the PowerBook G4 Reviewer's Guide purrs to would-be critics. "A mobile office. A conversation starter."

It's definitely a conversation starter. The conversations we started during our light testing of the Titanium, however, didn't ring with the lofty language. Accustomed to working with a soundtrack streamed from the Internet, we first cranked up *iTunes*, a streaming audio player that's now preloaded on all Apple systems. However, *iTunes* didn't appreciate multitasking. Even when playing streams from the MP3 server on our local area network, audio playback on the Titanium stuttered when asked to coexist with control panel dialogs or with applications such as *Internet Explorer* and *Outlook Express*.

AppleDVD Player fared little better. The gorgeous, extra-wide LCD screen makes the Titanium better suited to DVD playback than any other notebook we've seen. But even opening a drop-down from the menu bar caused DVD playback to hiccup, and getting out of full-screen mode was nearly impossible. The only way we found was to use a force-quit (option, control, escape).

To be fair, our multimedia choices weren't exactly in tune with the Apple spirit. Some difficulty playing a DVD of *Bullitt* is wholly understandable. We promise to give the Titanium another chance when we find ourselves possessing Apple-friendly DVDs: *Patch Adams*, maybe.

Lemon of the Month

Pentium 4 Ads

Say what you will about the technology advancements of Intel's new Pentium 4 processor, but the P4 advertising advancements aren't up to speed. The TV ad campaign for the Pentium 4 picks up where the Pentium III ads left off, with the Blue Man Group's colorful antics. But having them as spokesmen for the Pentium 4 doesn't add up. There are only three guys in the Blue Man Group. Our idea? Get a fourth Blue Man—maybe a guy on stilts to represent the Pentium 4's longer pipeline.

CHECK IT OUT

Online

www.maximumpc.com

Benchmarking: Full Disclosure

Visit **www.maximumpc.com/benchmarking** for the complete lowdown on *Maximum PC*'s benchmarking strategies.

20 PRODUCTS REVIEWED!

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Hardware photography by **AARON LAUER**

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Wolop Connexus A100

PACKS EVERYTHING BUT THE PUNCH

HDTV can't make up for this system's shortcomings.

PLUSES
- 1.5GHz Pentium 4 and gobs of dual-channel DRDRAM
- Excellent sound system care of SoundBlaster Live! Platinum and Klipsch ProMedia speakers
- Innovative HDTV tuner

MINUSES
- Poorly configured
- Too expensive for what you get
- TV tuner software a little buggy for our tastes

Designing a high-performance PC should be easy as pie. Just match the fastest processor with the latest and greatest components and bake until done. Witness the number of 1GHz (or faster) systems we've reviewed in the past four months with Pioneer DVD-ROM drives, TDK VeloCD CD-RW drives, SoundBlaster Live!s, GeForce 2s, Klipsch ProMedia speakers, and massive IBM Deskstar hard drives. Yeah, we're kinda tired of seeing them too.

That's not to say that these components shouldn't be used. They all qualify in both the latest and greatest departments. But with everyone using the same components, there isn't much left to distinguish one system from another. Enter Wolop. Despite loading its custom-configured Connexus A100 with the same laundry list of components as everyone else, the company has managed to send us something we've never seen before: HDTV.

That's right. The future of television has arrived in the form of a TV-tuner card from Hauppage. Besides pulling down standard analog broadcasts through antennae and cable connections, the WinTV-HD is the first product we've seen that competently handles digital broadcasts and pipes them out to your monitor. If you don't mind watching TV at your desk, Hauppage's new card does a job that a number of consumer electronics companies have managed to screw up through a hodge-podge of competing standards.

Unfortunately, the only way to currently receive high-definition digital broadcasts is through rabbit ears or a roof-mounted antenna, since the cable companies haven't gotten off their high-definition behinds yet. And since only a few networks are broadcasting digitally and offering only a handful of high-definition programs, there isn't a whole lot of content out there. We were only able to tune into five digital channels in San Francisco. To find HDTV broadcasts in your area check out **www.hdtvgalaxy.com**.

UNDER THE HOOD

THE BRAINS	
CPU	Intel Pentium 4
L2 cache	256K full speed
RAM	256MB dual channel PC800 Direct RDRAM
Moboard	Intel "Garibaldi" D850GB motherboard
Drive bays	Three 5.25-inch, two external 3.5-inch, two internal 3.5-inch
I/O ports	Two USB 1.0 ports | One serial | One parallel
DISPLAY	
Video	Creative Labs GeForce2 GTS 64MB DDR SDRAM
Refresh@ max res	1600x1200@76Hz
STORAGE	
Hard drive	45GB IBM 75GXP Deskstar 7,200rpm
DVD	16X Pioneer DVD-106
CD	TDK VeloCD 32x/12x/10x CD-RW
Removable	3.5-inch floppy drive
NETWORKING	
	None
MODEM	
	Wincomm 56k Faxmodem
SOUND	
Soundcard	Creative Labs SoundBlaster Live! Platinum 5.1
Speakers	Klipsch ProMedia 4.1 Surround
MISC	
	Hauppauge WinTV-HD Tuner Card
THE BUNDLE	
	Windows 98SE | *Intervideo WinDVD*

BOOTO 0:54 DOWN 0:08

While there's a huge wow factor to watching TV at ultra-sharp resolutions, the lack of content makes for a huge letdown when the novelty wears off. And the WinTV software's lack of polish doesn't help matters much. The tuner software is difficult to configure properly and even harder to troubleshoot when things go wrong. It also sucks up a ton of system resources. The remote control is handy, though.

Performance-wise, the Connexus A100 is limp, scoring middle-of-the-road marks during benchmarking. The machine was even worse off when we first got it in. Apparently the A-plus certified technicians that "construct and quality-test every Connexus A100" could only muster a D-plus on this job. Someone at Wolop forgot to install the 850 chipset drivers that, among other things, enable full AGP support and busmastering for IDE devices. Without the chipset drivers installed, we only pulled a pathetic 35fps in our *Direct3D* benchmark and 55fps in *Quake III*. We're pretty sure the A100 would've scored better in the rest of our benchmarks if someone at Wolop had given it a little more tender, loving care. As it stands, the Connexus A100 system manages to stand out with innovative HDTV capabilities, but gets dragged back down by poor performance and sloppy configuration errors.

—Sean Downey

TEST	ZERO	SYSTEM	RESULTS (%)	RANK
SYSmark	174	400	1.72	Unseeded
Hard drive	20.2MB/sec	20MB/sec	40.6	Unseeded
CD-ROM	26x	35x	-24.6	Unseeded
Photoshop	170sec	200sec	33.5	Unseeded
Direct3D	38fps	50fps	92.1	Unseeded
OpenGL	34.4fps	45fps	151	Unseeded

The benchmarks above reflect the 850 chipset driver update. Full benchmarking details at www.maximumpc.com/benchmarking/index.html

MAXIMUM PC VERDICT 6

$3,730 (w/o monitor) | Wolop
www.wolop.com | 800.841.9888

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EXPANSION NOTES

EXPANSION MAP

AGP	Graphics card
PCI	Free
PCI	TV tuner card
PCI	Free
PCI	Soundcard
PCI	Modem

CASE | COOLING | POWER

CASE

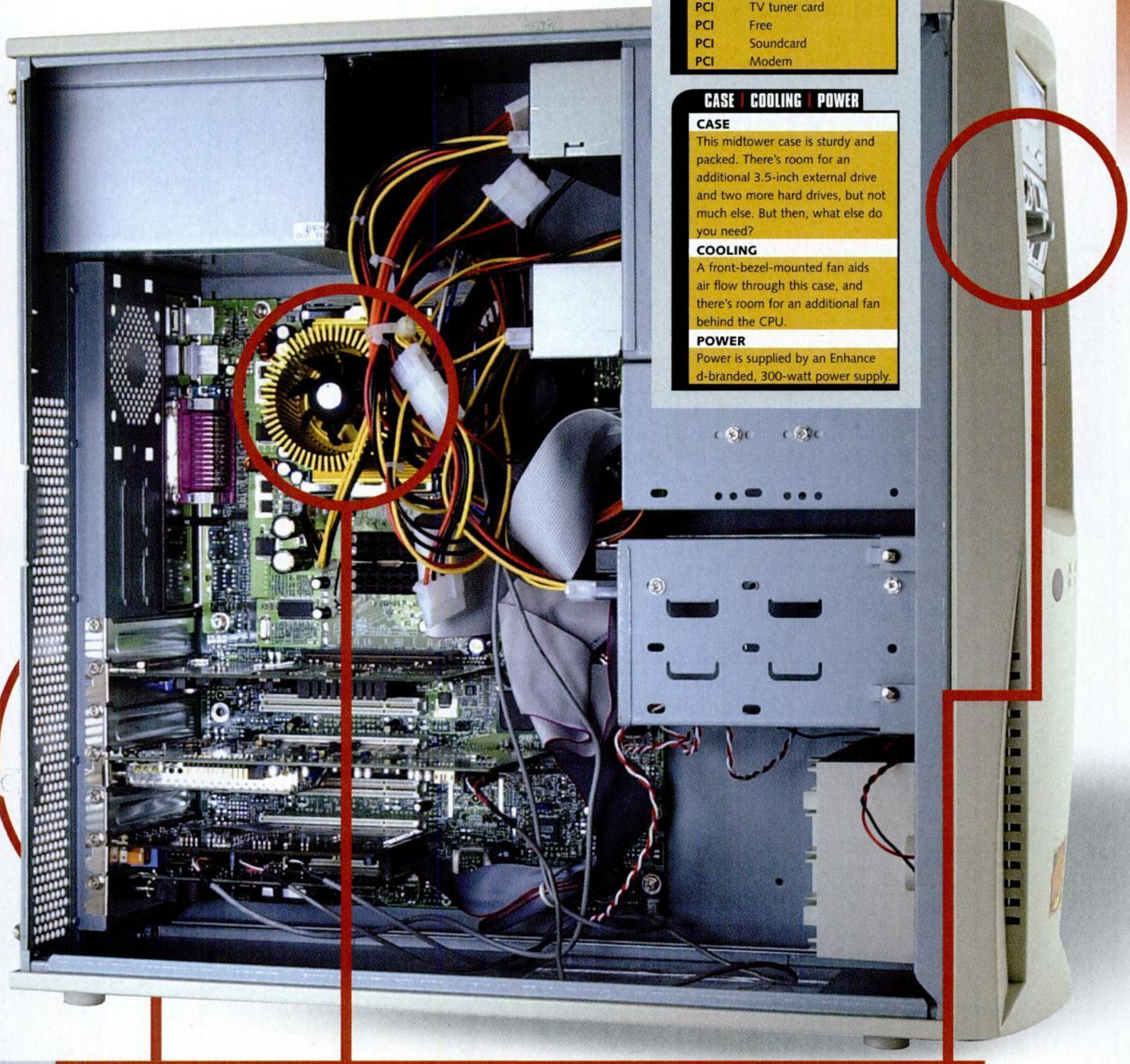
This midtower case is sturdy and packed. There's room for an additional 3.5-inch external drive and two more hard drives, but not much else. But then, what else do you need?

COOLING

A front-bezel-mounted fan aids air flow through this case, and there's room for an additional fan behind the CPU.

POWER

Power is supplied by an Enhanced-branded, 300-watt power supply.



HDTV unplugged. The WinTV-HD card in the center works its magic by directly writing to the frame buffer or using a pass-through cable.

Am I hot or not? With a Thermaltake Orb strapped on, this Pentium 4 won't lose its cool and doesn't get too noisy either.

Remote control. There's no Ken Ober, but the two remote controls that come with the A100 can fire up a CD, MP3 player, DVD, and TV faster than you can say "I want my MTV!"

IR connected. Wolop also gets some bonus points for putting the IR port on the front of the case.

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Northstar MemorySafe

PORTABLE BACKUP FOR YOUR SWEATY PALM

If you break into a cold sweat because you haven't synchronized your Palm in a week, Northstar Mobile's MemorySafe is the antidote you're looking for. Containing either 2MB or 8MB of flash memory in a tiny node, the MemorySafe plugs into the bottom of a Palm and allows you to back up your valuable data on the go.

We tested the 8MB version of the MemorySafe for the Palm III and Palm M series of PDAs. After loading the MemorySafe's 45KB backup application into the Palm IIIxe, we successfully backed up about 5MB of files in 15 minutes. That's not a stellar speed trial, though Northstar claims it's faster than backing up your Palm through a serial connection. The MemorySafe didn't miss any files on our Palm, but Northstar advises that you check your files after the backup because certain applications tied to the OS will not be stored.

You can also use the MemorySafe as a mobile storage device. Although you can't run applications or read documents out of the module, you can use it to swap out files as needed. The backup application is suitable for beginners. We really wished for more fine-grained control, as well as an incremental backup mode. It's just plain stupid to back up your entire Palm instead of only the files that have changed.

We really wished for more fine-grained control, as well as an incremental backup.

The MemorySafe is especially critical for people who are away from their PCs for an extended period of time. Some may scoff at you for being paranoid, but those who've lost data can understand the value of the MemorySafe.

—Gordon Mah Ung

PLUSES
Lets you back up your data on the road
Doesn't need a battery

MINUSES
Backup application needs more features.

MEMORYSAFE 8

$70 | Northstar Mobile
www.northstarmobile.com
408.845.9200

Klipsch ProMedia 4.1

THE BEST SPEAKERS JUST GOT A LITTLE BETTER

Klipsch PC speakers consistently blow away the competition, earning more Kick Ass Awards per capita than any other product line. So Klipsch's upgrade to its top-of-the-line speaker system, has a storied winning streak to uphold.

The ProMedia 4.1 system definitely reigns among PC speakers. The added features and tweaks to the internal electronics make a noticeable difference in sound quality. But do owners of Klipsch's previous 4.1 system iteration, the v.2-400, need to upgrade? Not really.

Klipsch's follow-up to its v.2-400 system sports a trio of cool new features and more boomy bass.

The newest 4.1 Klipsch speakers gained a trio of useful new features along with a name change. First, the master satellite comes with an on/off button and LED indicator on the front panel, as well as a pair of 1/8-inch connectors on the right side panel. Second, the connectors add a headphone output—the only thing anyone could criticize earlier versions for lacking. Third, there's now a line input for connecting the speakers to external audio devices.

Internally, Klipsch tweaked the crossover (which controls how the subwoofer and the midrange satellites work together), as well as the preamp circuitry. The result is crisper bass that rumbles harder when the subwoofer volume is cranked up.

Need a great set of PC speakers? Don't hesitate to get Klipsch's ProMedia 4.1. But if you've already got the best—and Klipsch's v.2-400s still qualify—don't sweat it.

—Rob Pratt

PLUSES
Better crossover tuning
On/off switch
Headphone output added

MINUSES
Not a monumental upgrade from the previous version

KLIPSCH PROMEDIA 4.1 10

$300 | Klipsch
www.klipsch.com
888.554.5665

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MP3 Mop-Up

THESE THINGS ARE BREEDING LIKE RABBITS, FOR PETE'S SAKE!

Despite our efforts to review every MP3 player on the planet in our March 2001 cover feature, we couldn't quite keep up with the breakneck pace of technology. Here's a look at just two of the players that didn't make our March press deadline.

Pine Palmp-3

About the size and shape of a yo-yo, the Palmp-3 is Pine Technologies' foray into the ultra-portable realm. It's also Pine's foray into the ultra-poorly-constructed realm. The Palmp-3's small, snazzy formfactor looked promising, but we accidentally popped off the "lock" button right away. We don't need devices to be made of carbon fiber, but we'd prefer they not feel like MacGyver constructed them from chewing gum and hairpins. And the unit is impossible to operate blindly because the buttons are flush with the case.

Pine
Small
Didn't cause grievous bodily injury

MINUSES
We prefer products that actually work

Intel
128MB memory
Simple, straightforward operation

MINUSES
Can't add memory

The Palmp-3 comes with just 16MB onboard and one MultiMediaCard slot (a 16MB card is included). At this stage of the MP3-player game, 32MB out-of-box is a ridiculously small capacity. At least the *Pine Audio Manager* software is straightforward—drag and drop files onto or off of the player—and the Palmp-3's USB transfer rate is more than acceptable. It also offers one-touch voice recording and an integrated phone book.

Frankly, these features don't matter a whit because they can't give back to us the hours wasted trying to get this odious bit of offal to work. With one exception, the Palmp-3 refused to recognize the MP3 files loaded on it. It's a shame, too, because when we did get it to work, sound output was quite good and *blisteringly* loud. But, for the most part, trying to operate the Palmp-3 was an exercise in futility. Do yourself a favor: Don't bother with this one.

The Palmp-3's not so bad looking. Too bad we wanted to crush its good looks underfoot in frustration.

Intel Pocket Concert Audio Player

Because it ships with 128MB of onboard memory, costs under $300, and marks Intel's introduction into the digital music market, the Pocket Concert Audio Player has received a lot of attention from the popular press. We've received tons of e-mail requesting a review, and, hey, we aim to please curious consumers. For that matter, so does the Pocket Concert.

You can't add memory to the Pocket Concert, but considering the still relatively high cost of SmartMedia and MMC cards, $300 for 128MB is a good deal. The Pocket Concert's simple, sleek case isn't the smallest we've seen, but its size—about that of a slim deck of cards—is far from intrusive. And while the unit is hardly heavy, it has enough heft to feel sturdy. Best of all, Intel has integrated the wheel nub we loved so much on the old-model Rio MP3 players—it makes scrolling through songs and settings incredibly easy. One-handed and blind operation is no problem, and we like the fact that there's a separate power button (integrating the Power button with the Play and/or Stop buttons, which many players do, often leads to power-control problems). The Pocket Concert's backlit LCD is easy to read and scrolls ID3 tag info while songs are playing.

The Pocket Concert isn't the loudest player we've listened to, but its volume is more than adequate, and its sound output benefits greatly from a feature we rarely see in portable MP3 players: customizable EQ settings that let you adjust treble and bass to your liking rather than relying on preset EQ options.

Intel's Pocket Concert Audio Player could use a less lofty name—its simple, no-nonsense approach to playing MP3s should appeal to the masses. Power to the people!

An FM tuner is part of the package, and optional kits will hook you up with a car adapter or cradle, but the Pocket Concert isn't about bells and whistles. In fact, that's one of the things we like best about it. It's not trying to be 800 things at once. It's simply a means for you to listen to music, and, by golly, it's a good one.

—Kristen Salvatore

INTEL SPECS
FORMATS
MP3, WMA, upgradeable
STORAGE
128MB onboard (not upgradeable)
CONNECTION TYPE
Mini-USB

PALMP3 SPECS
FORMATS
MP3, WMA, upgradeable
STORAGE
16MB onboard, open MMC slot (16MB card included)
CONNECTION TYPE
Mini-USB

PINE PALMP-3 2
$169 | Pine Technologies
www.pineusa.com

INTEL POCKET CONCERT 9
$300 | Intel | www.intel.com
800.538.3373

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Athlon Motherboards

NEW KT133A MOBOS ARE OVERCLOCKERS' DELIGHTS

Iwill
PLUSES
Good benchmark scores
Buttload of FSB speeds
Layout is roomy
MINUSES
Onboard audio

EPoX
PLUSES
Diagnostic LED
Excellent documentation
Overclocker's dream
MINUSES
Lowish benchmark scores
Big capacitors

Now that AMD has released higher-clocked Athlons that run on a faster bus, VIA has upgraded its venerable KT133 chipset to help these new procs realize their full potential. Indeed, during testing, our new KT133A-based mobos set speed records without even a wobble of instability—but that's what you get when you take a rock-solid chipset and boost its memory support from 100MHz SDRAM to 133MHz SDRAM.

Iwill KK266-R

Iwill was the first mobo vendor to place a DDR motherboard in our hot little hands, and it now trumps the competition again by integrating an ATA/100 RAID chip into its new KT133A board. This gem of a mobo is called the KK266-R and includes one AGP slot, six PCIs, and a lone ISA for people stuck in a time warp.

An AMI controller handles the RAID duties and delivers all the throughput that you'd expect from IDE RAID. The KK266-R's layout is well-designed, with the ATX power and ATA connectors sitting high on the board to keep cables out of the way.

The KK266-R outpaced the EPoX board in nearly every test. In *3DMark 2000*, the Iwill beat the EPoX by 4fps and nearly swept the EPoX in SiSoft's *Sandra* benchmarks. The Iwill also comes with a staggering number of FSB options. Yes, Virginia, there is an overclocking option on this board—the FSB goes up to 200MHz. Even voltage overclocking is possible (you can reach 1.85v in 0.025v increments).

Just try to overclock Iwill's KK266-R as fast as it can go. We dare you.

EPoX 8KTA3+

We were impressed with the 8KTA3+ as soon as we opened the box. If any motherboard could score a Perfect 10 on looks alone, this one from EPoX is it. Six PCI slots and a lone ISA slot set the base for a tasty confection. Throw in four DIMM slots (one more than standard) and RAID capabilities, and this cake just gets sweeter. The icing sets it off: EPoX threw in an LED diagnostic tool that tells you what's gone wrong when your system begins coughing. Very sweet, indeed. Our only complaint with the motherboard's layout is the close proximity of large capacitors to the proc socket. Other than that, this board is gorgeous to behold.

Beautiful to behold, EPoX's 8KTA3+ motherboard offers overclocking options to spare and a nifty onboard diagnostic LED.

Highpoint's HPT 370 controller handles RAID duties with confidence. The scores we saw were consistent with IDE RAID and a bit better than those of the KK266-R. In nearly every other test, however, the 8KTA3+ fell slightly behind the Iwill board. The boards tied in our real-world *Photoshop* testing, and the EPoX outscored the Iwill in SiSoft *Sandra*'s MIPS test.

Just like the KK266-R, the EPoX lets you increase the voltage to 1.85 volts and push the frontside bus to155MHz. There's even AGP voltage overclocking, if you're so inclined.

Even stacked against our high expectations, the 8KTA3+ board appears finely crafted.

—Scott Tarr

DARE TO COMPARE

MODEL	IWILL KK266-R	EPOX 8KTA3+
Chipset	VIA KT133A	VIA KT133A
Supported processors	Socket A Durons and Thunderbirds	
Expansion slots	1AGP/6 PCI/1 ISA	1 AGP/6 PCI/1 ISA
Memory support	3 DIMMs for 1.5GB of PC100/PC133 SDRAM	4 DIMMs for 1.5GB of PC100/PC133 SDRAM
Other	AMI RAID controller supporting levels 0, 1, and 0+1	HPT370 RAID controller supporting levels 0, 1, and 0+1
BENCHMARKS		
Quake III	**51.4**	51.0
SiSoft *Sandra* CPU	3364	**3368**
SiSoft *Sandra* FPU	**1679**	1632
SiSoft *Sandra* Dhrystone	**518MB/sec**	497MB/sec
SiSoft *Sandra* Whetstone	**585MB/sec**	554MB/sec
3DMark 2000	**38.4**	34.4
Photoshop 5.5	1:28	1:28

Notes: Each system was based on an AMD 1.2GHz Thunderbird with 266MHz FSB, 128MB of PC133 SDRAM, Windows 2000, two 7,200rpm IBM Deskstars, GeForce 256 with 6.31 Detonator drivers. Best scores are bolded.

IWILL KK266-R 10
$160 | Iwill USA
www.iwillusa.com | 949.753.5488

EPOX 8KTA3+ 9
$160 | EPoX International
www.epox.com | 714.680.0898

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Goody-Goody Gamepads

TURN YOUR PC INTO A SUPER-EXPENSIVE CONSOLE SYSTEM

Most PC games are designed to use an input interface that's no more complex than a keyboard and mouse, right? Wrong. You wouldn't try to play a flight sim such as *Crimson Skies* with a mouse, and you should never dare play sports sims with anything less than the best gamepads. We took a look at three popular gamepads to give you the inside skinny on what's available now.

Hammer FX

PLUSES
- Big enough for the meatiest of hands
- Precise analog sticks

MINUSES
- The Genesis controller lives on!
- Force feedback isn't the best
- Painful to set up

Wingman

PLUSES
- Great force feedback
- Small size for smaller hands

MINUSES
- Too small for large-handed folks
- The Genesis controller lives on!

ProPad

PLUSES
- Low price
- All you need for most sports games
- Plug it in and it works

MINUSES
- No analog control
- Useless for console ports expecting an analog stick
- The Genesis controller lives on (with a joystick plug)!

InterAct Hammerhead FX

The Hammerhead FX is a rumbling wonder. It includes two analog sticks, a digital D-pad (directional pad), six thumb buttons, and four triggers in a tasty USB- or joystick-port shell. Our only gripe is that the FX uses the standard button layout for PC gamepads: two rows of three buttons. This layout was great when we mainly played PC ports of *Madden '94* for Sega Genesis, but now the button layout should mimic Playstation 2 or Dreamcast controllers.

Control on both the D-pad and the analog sticks was quick, precise, and responsive. Force feedback is provided by two motors, one in each prong of the controller. This is the same layout used in the Logitech controller reviewed below, but the FX doesn't pull it off with the same smooth feel. The pad's control software allows for quick setups that should work with minimal tweakage for sports sims, racing games, and shooters, as well as totally customizable configurations.

If you have huge hands, get a Hammerhead FX—it's designed for the meaty-fisted.

Logitech Wingman RumblePad

The Logitech Wingman RumblePad uses the same basic button and stick layout as the Hammerhead FX, but adds a throttle above the button array. Be warned that the RumblePad is USB-only, so it won't work with Win95.

Less ham-handed individuals will probably prefer the Wingman, which has a design that's more accommodating to dainty hands. The Wingman allows precise control with either the analog sticks or the D-pad. For the $30 asking price, you can't go wrong with the Wingman RumblePad.

InterAct ProPad Advanced

The Interact ProPad Advanced is a simple little controller that should be more than adequate for most sports games. Regrettably, it will leave you wanting when playing games such as *Tony Hawk* that scream for analog control.

The ProPad is essentially a Sega Genesis controller circa 1993 with a PC gameport plug on the end. While this is all you need for most PC sports games, it's worth spending $10 more to get a pad that has analog sticks.

One definite plus in the ProPad's column is ease-of-configuration. USB has caused major installation issues for PC gamers, especially for people who plan on connecting more than one gamepad. Because the ProPad uses the tired old gameport, you plug it in, tell the Game Controllers Control Panel applet it's there, and begin playing.

—Will Smith

The Logitech controller is a great choice for anyone who wants dual analog sticks and force feedback.

Looking for a cheap pad that will work well in sports sims? Look no further than the ProPad Advanced.

HAMMERHEAD FX — 8
$30 | InterAct
www.interact-acc.com
410.785.3083

WINGMAN RUMBLEPAD — 8
$30 | Logitech
www.logitech.com
800.231.7717

PROPAD ADVANCED — 6
$15 | InterAct
www.interact-acc.com
410.785.3083

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NBA Live 2001

THE MAKINGS OF A DYNASTY

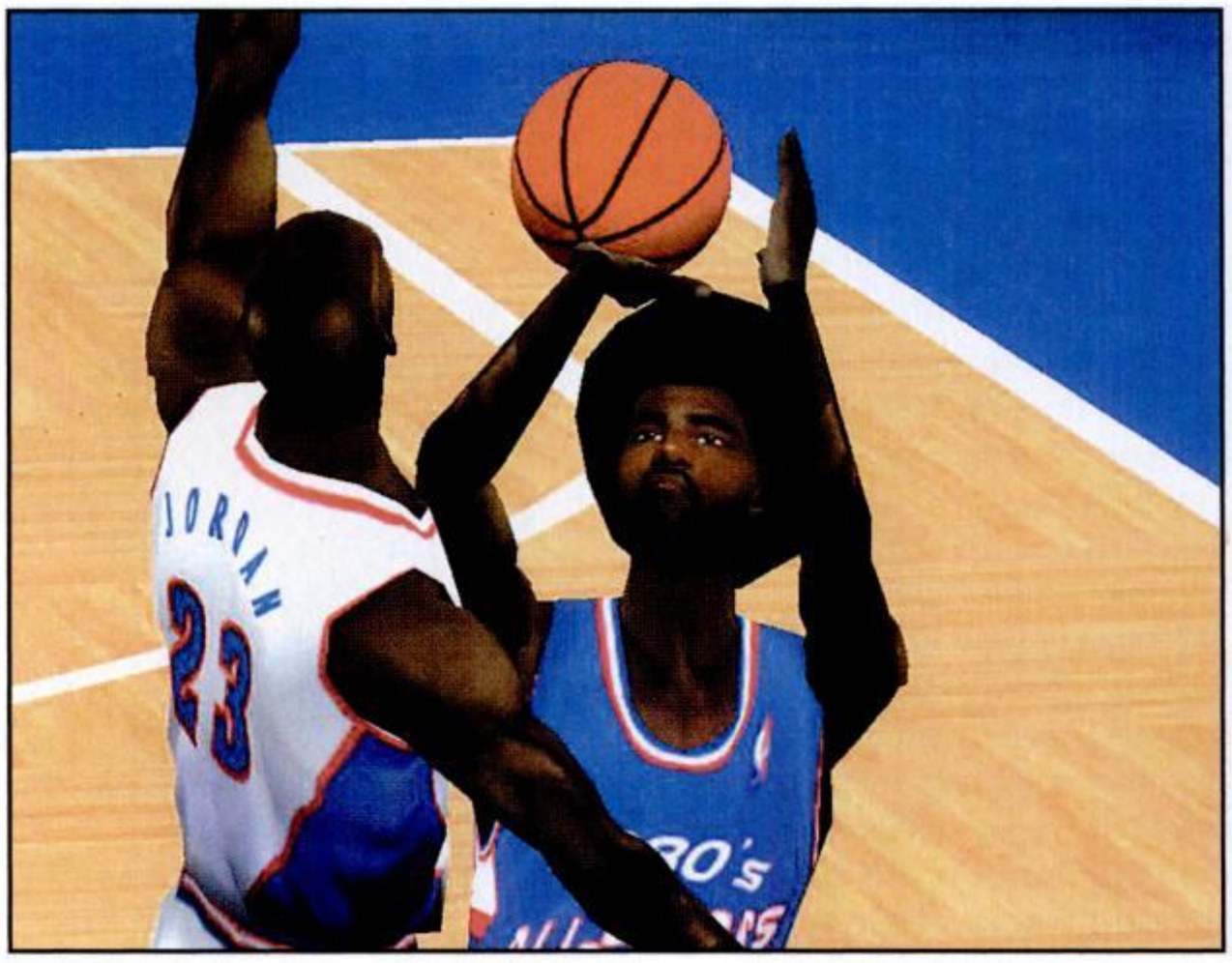
MAXIMUM PC KICK ASS! product

If you keep doing the same thing again and again, you're bound to get it right eventually. Electronic Arts Sports knows this. Just as sure as the seasons change from baseball to football to basketball, the company can be counted on each year to release an update of one of its venerable sports sims. The new millennium is no different, and *NBA Live 2001* is about the best thing you'll find when it comes to simulated basketball perfection.

All the features you've come to know and love in previous editions are here: full NBA players and team licenses, a powerful player editor, and both arcade and sim modes. In fact, there's not that much different from last year's model. But if you skip a few generations and compare, you'll find the improvements are striking. And that's true of any evolutionary process. Just compare the subtle refinement of Shaq with the Neanderthal brute of Wilt Chamberlain. OK, bad example.

PLUSES
- Excellent graphics
- Responsive controls
- In-depth roster management
- Completely configurable
- All-star squads from the 1950s through 1990s
- Can save highlight reels as AVIs

MINUSES
- AI quirks
- Can't draft from vintage all-stars
- Can't save during games

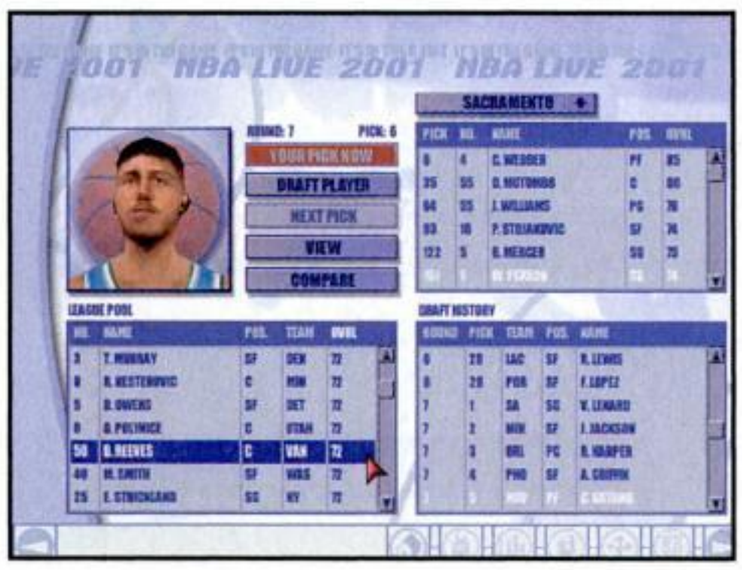


In an all-star showdown, Michael Jordan gets up in the face of a befro'd Dr. J.

Gameplay

One of the highlights of *NBA Live 2001* that sets it apart from the console competition is the game's franchise mode. This allows you to either start with your existing line-ups or draft from the entire NBA roster and then play a 25-year career. Game after game, year after year, you get to trade players (the computer rejects bogus offers) and retire existing players. And unlike console games, one of these players can be yourself. While the console version includes the same excellent player editor, the PC version of *NBA Live 2001* allows you to map an actual digital image of your own face onto a custom player, complete with control points around the eyes and mouth to create fierce expressions during nasty dunks.

As far as actual play-by-play action, the latest version of *NBA Live* suffers some now all-too-familiar quirks (though the game is still better than other hoop sims). The Starter level games quickly become blow-outs, but at the Veteran level, the game is nigh unbeatable. Also troubling is the selective stickiness of your players. Loose balls and rebounds will sometimes literally pass right through your polygon hands. The most frustrating glitch causes even your big men to pull up jumpers under the basket, instead of laying down the jam.



The draft screens in *NBA Live* 2001 are consistent with the game's excellent interface.

Missing from this version of *NBA Live* are the three-point shoot-out and the practice session familiar from previous years (although playing One-on-One mode with Player 2 set for "user controller" works just as well if you want to refine your moves without a defense harassing you).

Technology

Player graphics in general have vastly improved, and most stars can be recognized solely by their accurate depictions in the game. Bench players appear to be assembled out of stock facial parts, but are still very good renderings.

With support for resolutions of up to 1600x1200 at 16-bit color depths (which demands a burly 3D card), the graphics are outstanding. From the incredibly detailed arenas (complete with home-court hardwood) to the fine nuances of the player skins, *NBA Live 2001* takes sims one step closer to blurring the line between computer and actual TV broadcasting. TV-style graphic overlays that cycle throughout the game only add to the realistic "I love this game!" effect.

An excellent replay feature allows you to watch the action from any vantage point in the arena, and there's also the option to save screen captures with just a click.

Despite some minor quibbles, *NBA Live 2001*'s combination of in-depth control and free-flowing on-court action leads all MVP candidates this year.

—Brad Dosland

MAXIMUM PC VERDICT

TECHNOLOGY	9
GAMEPLAY	9

$40 | Electronic Arts | www.easports.com
650.513.7555

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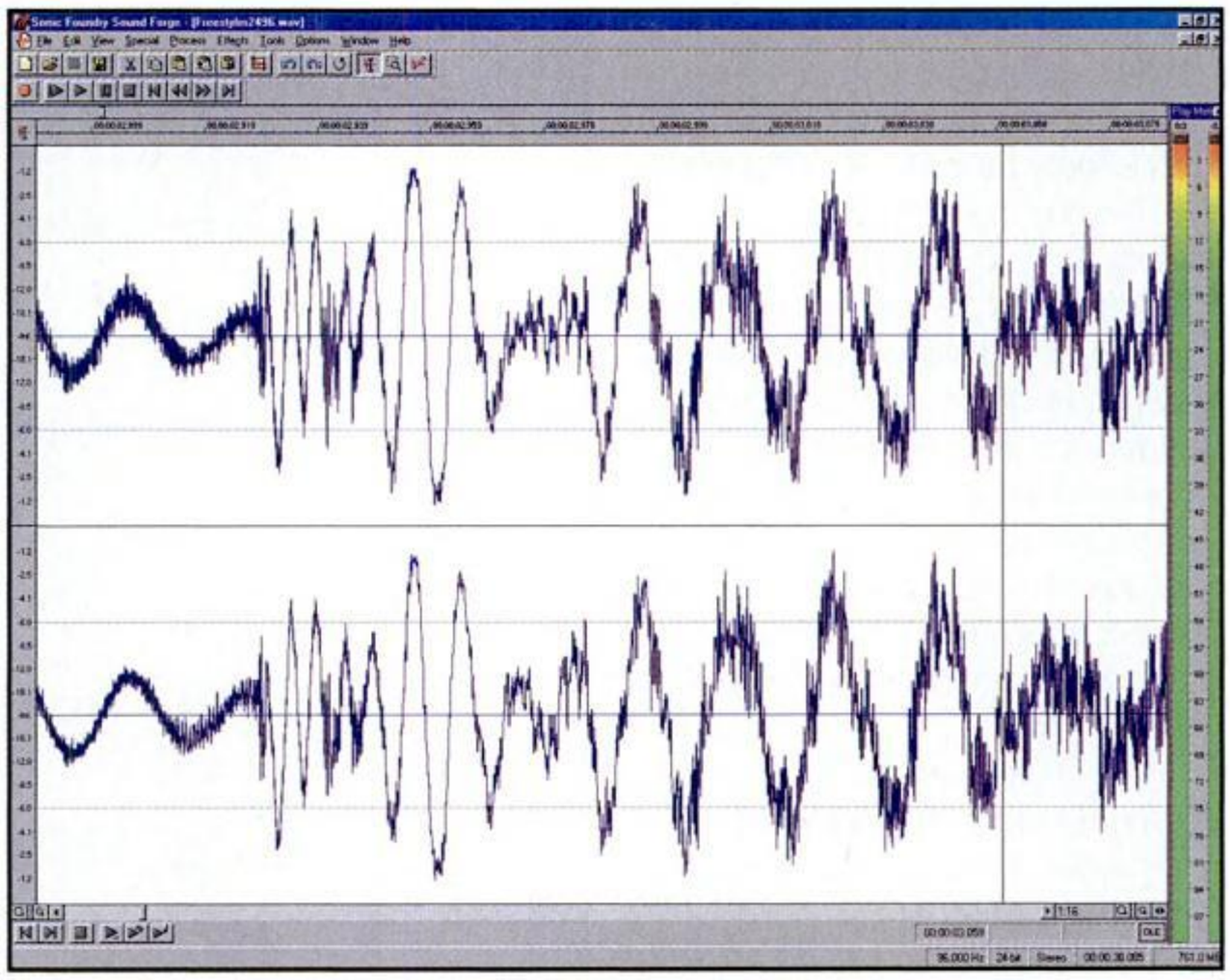
Sound Forge 5.0

EDIT THAT FUNKY MUSIC, B-BOY

The third version of Sonic Foundry's full-featured stereo audio editor helped PC users break the Macintosh monopoly on digital audio production. The newest upgrade to *Sound Forge*, version 5, reinforces the PC's role as a competitive player in pro-level audio production. What you'll find are essential extensions to existing features and full-fledged additions that keep *Sound Forge* current.

Sound Forge is meant for hardcore digital audio editing—say, cleaning up MP3s, preparing audio tracks for video, or seamlessly piecing together an original clip from several samples. The biggest of the application's new features is support for up to 24-bit audio at sampling rates up to 192KHz. Now, *this* is high-fidelity. (CD-quality audio is produced with only 16-bit audio sampled at 44.1KHz.)

For most applications, 24-bit capability means better resolution for audio signal processing. Digitally boosting the volume on a 16-bit audio file can reveal "graininess" or brittle sound—roughly the audio equivalent of the "stair-stepping" visual effect that shows up when you enlarge a low-resolution image. Higher resolutions reduce the graininess of digital audio, which means that an audio file can weather more signal processing without perceptible degradation in quality. Many audio engineers believe that higher sampling rates enhance the true-to-life purity of an audio recording and represent the future of the commercial recording industry.



***Sound Forge 5.0* delivers resolution to spare with 24-bit, 96KHz audio support.**

We tested *Sound Forge 5.0*'s 24-bit, 96KHz sampling capability with Echo Audio's Mia PCI audio card, which supports high resolution and sampling rates. After applying a series of processing and effects, the higher-quality, 24-bit, 96KHz file retained considerably more of the smoothness and punch of the original than did a 16-bit, 44.1KHz, CD-quality file.

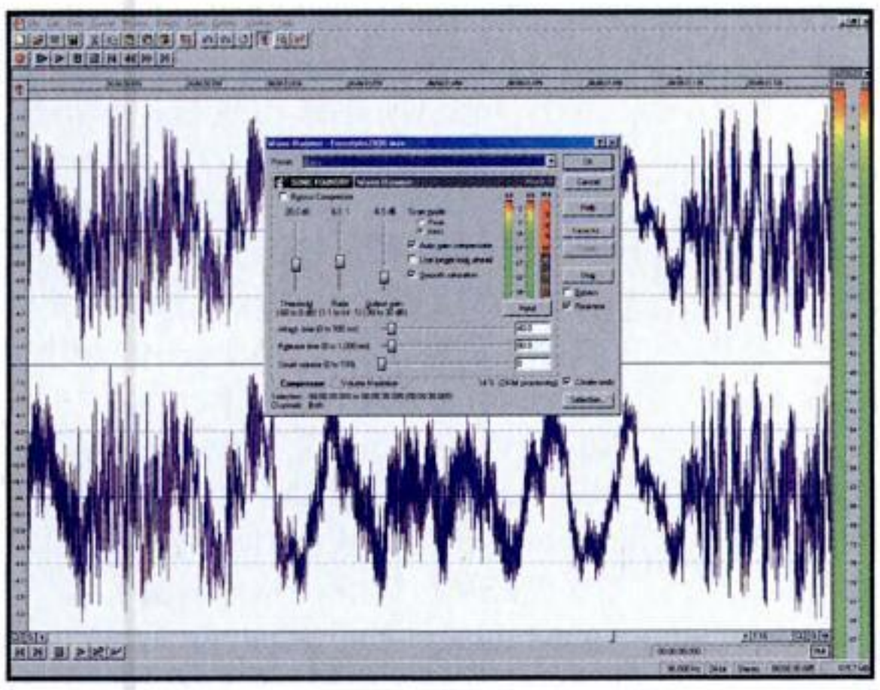
Of course, higher-quality audio comes at a price. *Sound Forge 5.0* provides realtime previews for most signal processing and effects, and previewing more than three chained effects applied to a 24-bit, 96KHz file quickly bogged down our 733MHz Pentium III, 128MB test system causing playback glitches and system hangs.

Refinements in *Sound Forge 5.0* include a better interface for applying DirectX-compatible audio effect plug-ins—and *Sound Forge 5.0* comes bundled with many top-notch DirectX plug-ins. Among the integrated plug-ins are all of the basic audio effects from Sonic Foundry's XFX packages (such as chorusing, flanging, reverb, and delay) and *Acoustic Mirror*, which creates reverbs that mimic real-life environments.

You also get *Wave Hammer*, a new audio-mastering plug-in that debuts with *Sound Forge 5.0*. *Wave Hammer* goes a long way toward letting desktop PC users add a mastering engineer's refinement and polish to digital audio created in a home studio.

All in all, *Sound Forge 5.0* is more like a remake of a classic tune than a stunning new symphony. It preserves the precise audio editing tools that have made the application a favorite among digital audio pros, but brings the software up to the minute with a suite of new ideas to make the application an indispensable part of any PC-based digital audio studio.

—Rob Pratt



***Wave Hammer*, a plug-in bundled with *Sound Forge* 5.0, makes desktop PC users masters of their audio domains with EQ and processing features that add refinement and polish to digital audio files.**

PLUSES

- 24-bit, 192KHz sampling rate support
- Plenty of bundled plug-ins
- Complete set of audio-editing tools

MINUSES

- Realtime effects previews are resource hogs
- CD ripper/burner too basic

MAXIMUM PC VERDICT **8**

$450 | Sonic Foundry
www.sonicfoundry.com
800.577.6642

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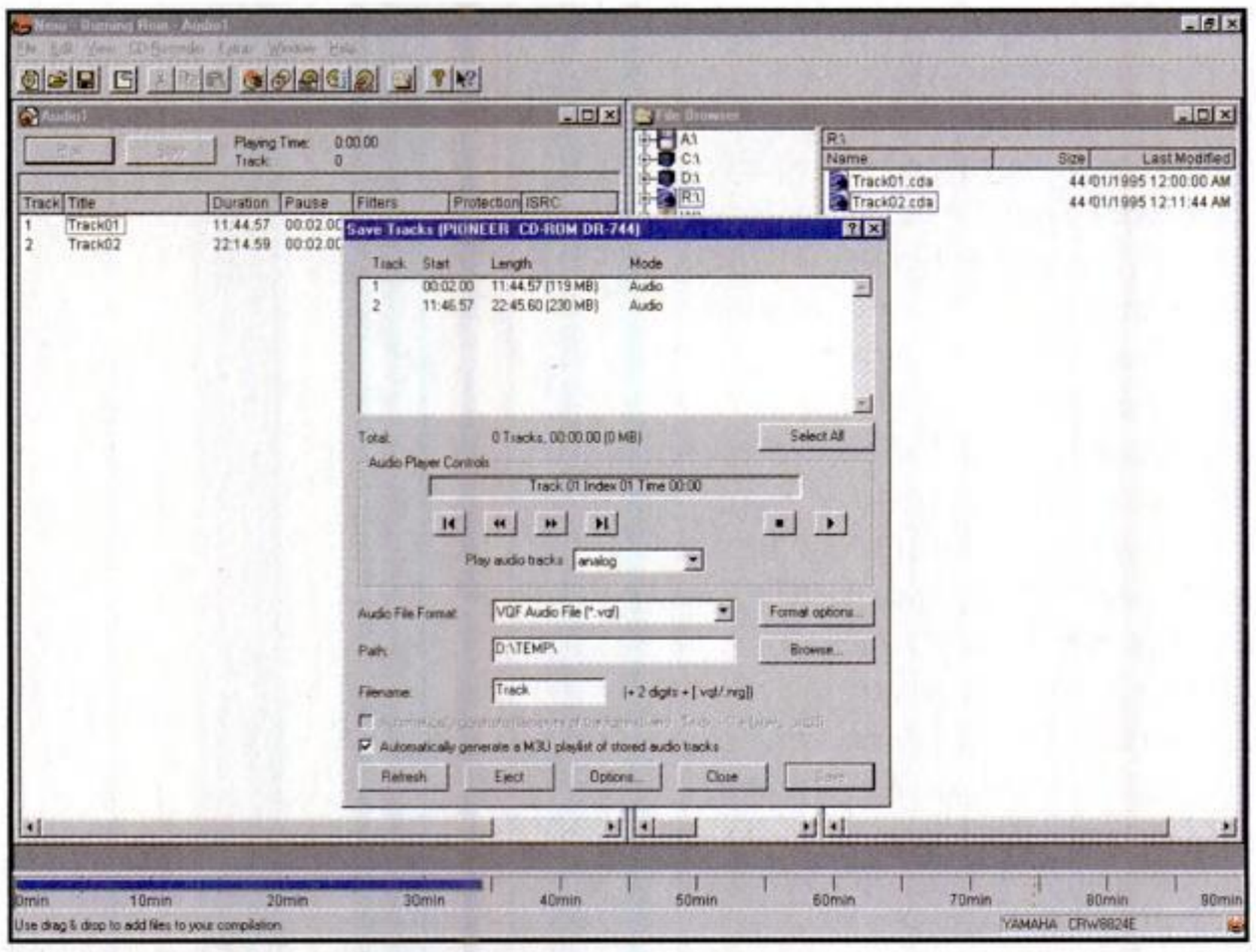
CD Mastering Make-Out Party

DISC-BURNING SOFTWARE CATCHES FIRE WITH FEATURES GALORE

The few CD-burning software applications available two years ago were considered kick-ass if they simply burned CDs effectively. But the latest packages handle a variety of tasks: batch jobs, multiple file format conversions, compression, copy verification, and multiple drive copying. Most also include support for indispensable CD burner technologies that no hard-core CD freak would stoke the fires without—namely, overburning for extra-large-capacity CDs and Sanyo's coaster-extinguisher known as Burn Proof.

Here's a look at three CD-mastering apps that might incite your inner pyro.



***Nero* supports VQF encoding, but the menu system is counterintuitive.**

Nero 5 PLUSES
- VQF encoding/decoding
- Overburning
- Strong file-manipulation tools
- Handles many file standards

MINUSES
- Limited MP3 encoding
- Counterintuitive menu system
- Brain-dead CD labeler

Easy CD PLUSES
- Highly intuitive interface
- Unlimited MP3 encoding
- Great data caching
- Excellent file-manipulation tools
- Handles many file standards

MINUSES
- No overburning
- No batch jobs

Nero 5

Its interface isn't pretty, but Ahead's *Nero 5* boasts power to spare. The software offers support for the basic audio and video CD types that any respectable CD-burning application must accommodate, as well as support for ISO 9660-standard multisession CD-ROMs, the Hierarchical File System for Mac CDs, and UDF 1.5 for use with Direct CD. Does any of this make sense to you? Fear not. Just rest assured that *Nero 5* doles out a bucketful of support. Even better for CD-burner performance tuning, *Nero 5* allows user-configurable settings for write-cache size and location.

Unlike the other applications in this roundup, *Nero 5* provides a full set of tools to custom-tweak CD content. Audio filters include EQ, stereo widening, echo, and even a karaoke filter that removes human voice frequencies. You can test the filters out in realtime and apply multiple filters simultaneously. *Nero 5* also supports overburning for oversized CDs. Not all CD recorders offer this feature, and *Nero*'s developers recommend testing the procedure cautiously by starting with a 30-second overburn. Overburning doesn't add a lot of additional time to audio CDs, but it adds enough for CDs that run a tad long and can't be copied using normal methods.

Nero introduced TwinVQ (a.k.a. VQF) support in a patch to the last full version, but it's built into *Nero 5*. NTT developed the high-quality VQF audio compression format, which produces tracks that sound better than MP3 at 25- to 30-percent greater compression. The drawbacks are that VQF files take longer to encode and they aren't yet widely supported by audio applications and portable audio players.

Nero 5's MP3 support leaves much to be desired. Out of the box, the application allows just 30 MP3 file encodes, after which you're expected to shell out $15 for Ahead's *MP3 Encoder* plug-in. While all three CD burners reviewed here come bundled with a CD label creator, the copy of *ExpressIt* that came with *Nero 5* is a disaster area. Several buttons don't work, and neither do right-click menus. Text formatting ignores font sizes and box orientation, and hitting the vendor's URL listed in the *ExpressIt* help file returns a blank page.

Despite *Nero 5*'s hard-to-navigate menus and limited MP3 support, the application is rich in features, and the VQF format support offers a bonus if you're tight on space and want the best possible sound for your compressed audio files.

Easy CD Creator 5 Platinum

More like a care package than a software package, *Easy CD Creator 5 Platinum* includes such surprise goodies as a photo album organizer, a hard-drive backup feature, a multimedia slide show creator, and a video postcard designer. Amid these extras, *Easy CD Creator*'s original purpose—to provide a powerful burning engine that's easy to use—remains intact.

The incorporation of *SoundStream* makes the latest *Easy CD Creator* even easier to use than its predecessors. Formerly only available separately, *SoundStream* previously provided minimal burning functionality with an intuitive interface. Built into version 5, *SoundStream* now has many of the editing and file-manipulation controls of *Easy CD Creator*. *SoundStream* has its own browser that lets you easily select WMA, WAV, and MP3 files for encoding and decoding.

Unfortunately, Roxio didn't finish the job of melding *SoundStream*

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and *Easy CD Creator*. Audio manipulation options such as EQ and pop filters can only be accessed through *SoundStream*—they're not linked from *Easy CD Creator*'s Music CD Project module. Likewise, the Music CD Project module provides MP3 file configuration controls (bit rate, stereo/mono, and frequency response settings) not found in *SoundStream*. Both CD interfaces should provide all the available tools; there's no reason you should be prevented from selecting a file format and manipulating that file with audio tools at the same time.

The most important upgrade in *Easy CD Creator* is its unlimited MP3 encoding support, with bit rates up to 320kbps. (Only MP3 decoding was available in *Easy CD Creator 4*.) In addition, version 5's Direct CD module, which prepares CDs for drag-and-drop data recording, now supports DVD-RAM (both single- and double-sided), compression for CD-R, and closing CDs to either the ISO 9660 standard or Direct CD's UDF 1.5 format.

Version 5 does a great job of caching data during CD burning. *Nero* and *Click 'N Burn* both protested when asked to run a CD player and burner on the same IDE channel—they reset the burner speed from 8x to 4x during any track copying operation without even a warning dialog. *Easy CD Creator*, however, tested the drives and accepted the 8x default, copying files in half the time—repeatedly and without errors.

Despite the software's ease of use, the placement of *Easy CD Creator*'s entire menu structure behind a system tray icon needlessly consumes system resources—and can cause conflicts with other programs. If you disable the startup icon, closing one of *Easy CD Creator*'s modules doesn't return you to the main screen. Instead, it closes the application!

Click'N Burn Starter
Disc Copy
Make a CD to CD copy from a CD-ROM drive to the CD recorder (or from the CD recorder to itself).
Audio Disc
Create a playable audio compilation CD from Wave and MP3 files or from other Audio CD tracks.
Click'N Burn
Data Disc
Create a new CD-ROM, or add more data to an existing multi-session CD-ROM.
DJ Burn
Record music like to a cassette. Also live audio!
CD-R, Recordable
Recorder:
(W:) - Yamaha CRW8824E
Blank Disc (CD BB), 79:57 - 702.83MB Free
Select one of the basic operations you can do with your CD Recorder using the Starter. Click on Go To Full Application to open the full featured Click'N Burn.
Open this Starter at startup
Go To Full Application
Close

***Click 'N Burn* 1.5 *Pro*'s interface easily automates the basics of audio and data file copying.**

Easy CD Creator lacks a variety of power-user options. It doesn't let you overburn CDs, and it won't allow you to create batch transfers. But for a solid set of features and successful automation of encoding and transfers, *Easy CD Creator 5 Platinum* is one of the best CD burners available.

Click 'N Burn Pro 1.5

While *Nero* and *Easy CD Creator 5 Platinum* include features for encoding and tweaking compressed audio, *Click 'N Burn Pro 1.5* instead concentrates solely on recording and duplicating CD audio and data files and video CDs. The minimal interface makes setting up a CD-burning job a tad tedious, but *Click 'N Burn*'s ability to simultaneously employ and individually configure multiple CD burners makes it an efficient CD-burning application.

Click 'N Burn Pro 1.5 offers several performance tuning options. You can manually determine the size of files to be cached, which is useful for improving speed when you're transferring hundreds of small files. The application's option to copy the entire disc instead of one track at a time comes in handy when your source disc contains index points or CD-resident text. And *Click 'N Burn* lets you change drive settings, such as auto-insert notification. Like *Nero*, it supports overburning and can also manage multiple burners and perform different recording jobs simultaneously. We found this to be both safe and handy, particularly when creating disc images or transferring files from a hard disk to CD.

The application does have some quirks. *Click 'N Burn* is finicky about what it considers to be MP3 audio files. Only 44.1KHz stereo, 16-bit MP3 will do—if you've been converting phone conferences into mono MP3 files, *Click 'N Burn* won't transfer them. Also, *Click 'N Burn* lacks a built-in file browser, which means you're forced to click and drag files out of Windows Explorer or copy and paste files out of an Add Files dialog box to set up a recording session. The task is made only slightly less tedious by an internal link to Windows Explorer.

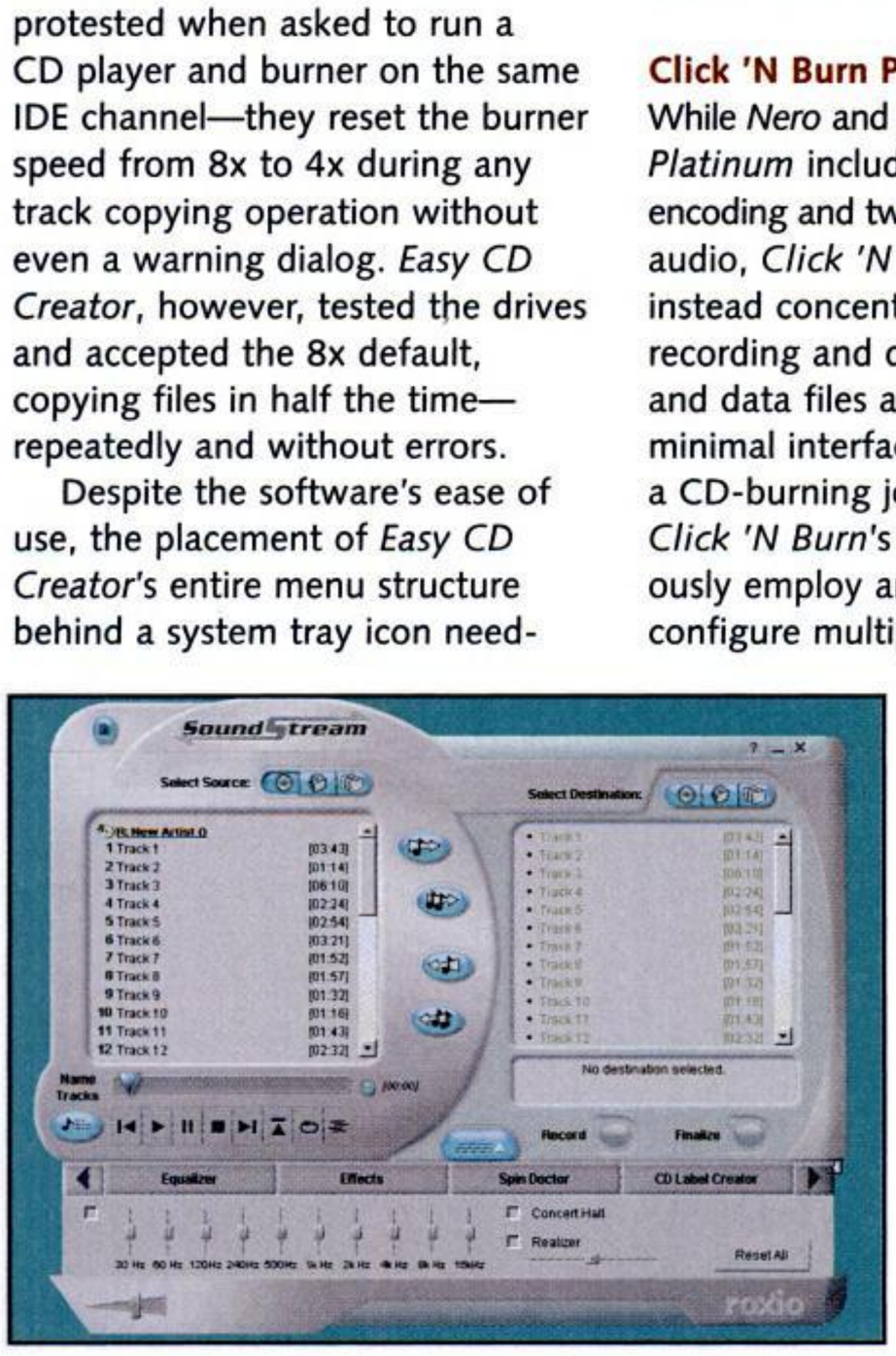
Despite the stripped-down interface, *Click 'N Burn Pro 1.5* effortlessly streamlines disc copying and audio or data disc creation. It's not an application that offers all things to all people, but *Click 'N Burn* is a powerful tool for automating audio and data file copying.

—Barry Brenesal

Click Burn

PLUSES
- Batch jobs
- Manual caching configuration
- Overburning

MINUSES
- No MP3 encoding
- No file manipulation tools
- No built-in file browser



***Easy CD Creator 5 Platinum*'s *SoundStream* is an attractive interface that incorporates effective audio manipulation tools.**

NERO 5 — **8**

$69 ($49 upgrade for *Nero 4* users); $15 for the *MP3 Encoder* plug-in | Ahead Software
www.ahead.de

EASY CD CREATOR 5 — **9**

$80 (after $20 rebate)
Roxio | www.roxio.com
408.259.7694

CLICK 'N BURN — **7**

$50 | Stomp, Inc.
www.clicknburn.com
888.426.2914

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Ulead VideoStudio 5

GOOD FOR BASIC CUTS, BUT NOT FOR SERIOUS SURGERY

PLUSES
- Quick switching between storyboard and timeline
- Solid DV support
- Wide range of digital effects

MINUSES
- Very clumsy capture and output selections
- Cramped timeline
- Rigid, inefficient interface

Video editing used to be tedious manual work involving razor blades and tape. Now people who can't even be trusted with tape, let alone a razor, can safely hack apart everything from home movies to *The Godfather*, courtesy of Ulead's *VideoStudio 5*. It's definitely a sharper instrument than lightweight video editors aimed at inexperienced home users, but for heavy-duty work, *VideoStudio 5* has a few too many dull edges.

In conjunction with a video-capture board that uses the Texas Instruments or Microsoft FireWire driver, *VideoStudio 5* can keep original content all-digital. For digital video captures larger than 4GB, *VideoStudio 5* uses a multiple-file workaround to handle monster-sized clips. Analog captures, however, hit the 4GB wall, since the *VideoStudio 5* drivers don't support the monster-clip workaround.

VideoStudio 5 supports a wide range of formats but notably leaves out a built-in tool to extract MPEG2 data from DVDs. DVD rippers typically output to files with a .vob extension. Rename the output file with a .mpg extension and *VideoStudio 5* will open it right up. Adobe *Premiere* users will find *VideoStudio 5*'s timeline interface familiar, and novices can switch to an easier (and less powerful) storyboard layout with a single click. Video is limited to one track with an effects layer for still overlays—an inconvenience for complex projects. The two audio tracks support most common audio formats and make laying in soundtracks a snap.

With *VideoStudio 5*, any cinematic work is fair game for the chop.

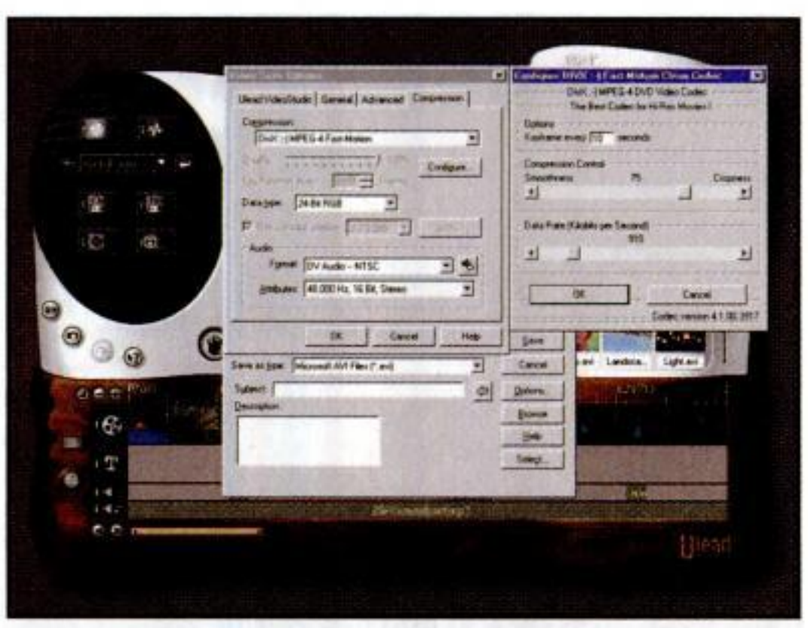
The application comes with dozens of digital transitions (A/B rolls) as well as a wide range of video filters to pop colors and apply psychedelic distortions. An immovable effects palette shows animated demos of wipes, warps, and other A-to-B transitions. There's no way to stop the animation, which makes for a very distracting screen, and once you choose an effect, you can't get a realtime preview before you drop it on the timeline. The only way to see the effect is to apply it and then play through the preview, at which point you can go back to adjust or replace the effect if it offends.

VideoStudio 5 easily outputs video for playback on PCs—but getting video output ready for tape or DVD is either difficult or impossible. For Betacam or Super VHS, *VideoStudio 5* is capable but not terribly helpful. If you have multiple output devices on your PC, you may need to save the output to a file, then use the playback utility that ships with most analog videocards to pipe it to tape. Codecs for most video formats are included for PC playback, but burning a full-blown DVD with all the trimmings requires a DVD/VideoCD authoring plug-in that was in beta at the time of our review.

There isn't much rhyme, reason, or advice offered when you select capture or output formats, and the seemingly unrelated cascading interfaces for the bundled capture board, the codec, and the editor can become overwhelming. Ulead could have made this easier, but it unfortunately dropped the ball. As a video-editing workspace, the over-engineered, non-standard display only wastes space that could have been better used for a more complete view of the video clips and the available effects.

VideoStudio 5 has attractive effects and enough punch to manage a complicated project with multiple audio and video streams. If you're planning to go on the air with your video productions, however, watch for sales on more upscale, customizable video editing systems.

—Jason Compton



***VideoStudio* supports tons of video formats, which is both a blessing and a curse.**

MAXIMUM PC VERDICT 8

$100 | Ulead | www.ulead.com
310.896.6388

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Ulead Photo Express 4.0

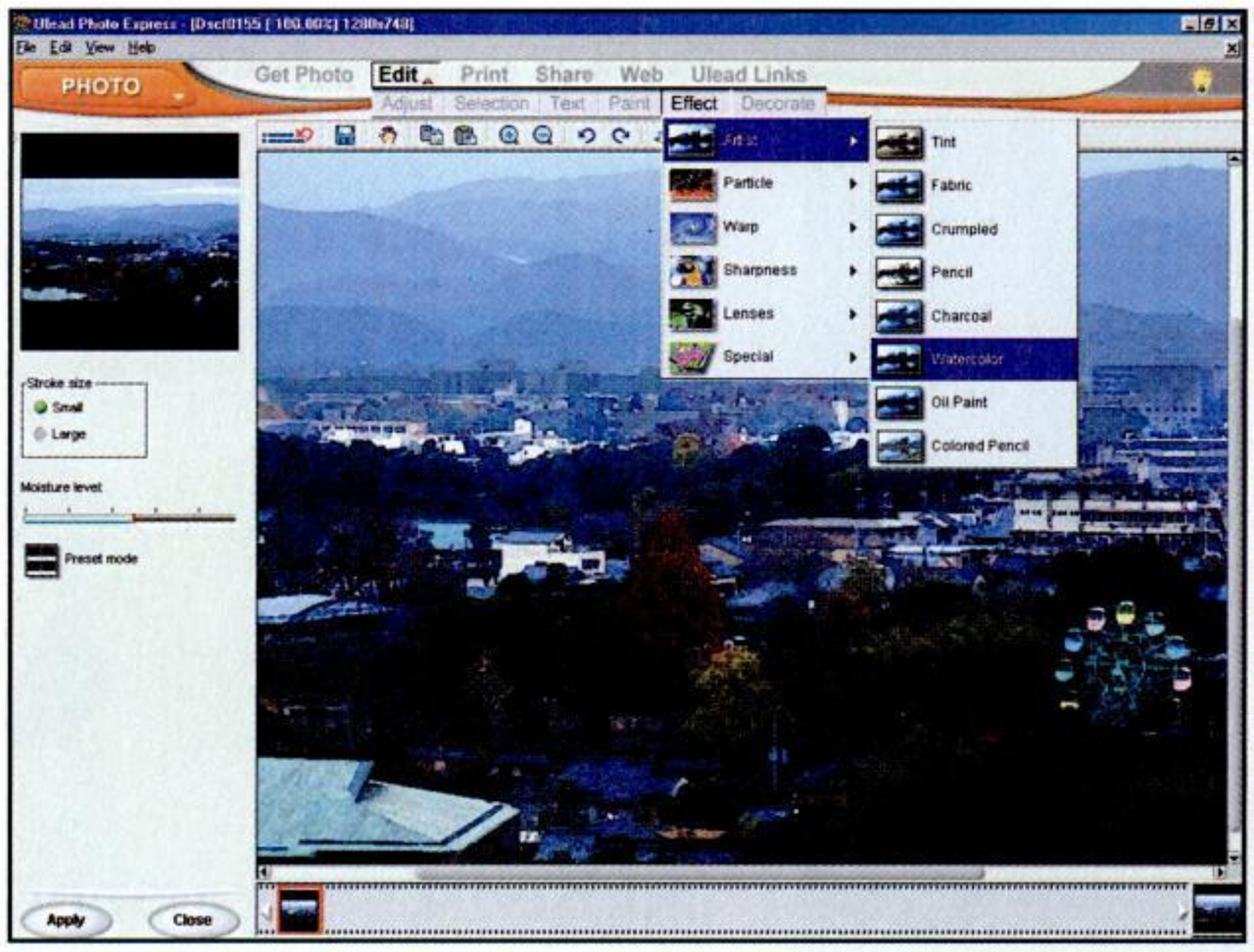
ONE SIZE FITS NONE

Taking a cue from Corel's software offerings, Ulead has stuffed *Photo Express 4.0* with scads of extras, including more than 4,000 digitized photos, some 600 graphics, and nearly 1,000 templates. There are even 50-odd audio files—for some unfathomable reason, this entry-level image-editing app supports WAV and MP3 formats. All this bloat requires two discs and pushes 300MB in a standard install. In this age of hard drives that commonly boast 10 gigs of storage, however, this isn't a massive crime.

But the quality of the included material is. *Photo Express 4.0* includes too few tools for serious digital artists and probably too much digital dreck for novices.

Granted, the extras included with *Photo Express* aren't any worse than the schlock that ships with other shovelware, but some of the art is so bad, we're convinced that only truly talented digital artists could have created it.

You should also be wary of the included canned effects. You'll find such tired clichés as the curled page corner and an entire collection of dog-nasty frames. One feature lets you add canned effects to your still images in order to create animated GIF files for the web. While this might prove handy for someone with access to a large library of elegant effects, the bundled choices are severely limited. You can paste your image to the sides of a rotating Rubik's Cube, run your image through a kaleidoscope blender, and even overlay one of many included fireworks displays. Wow.



Even the Advanced Mode controls don't offer very much control over effects.

Entry-level apps always seem to sacrifice precision control for user-friendliness. *Photo Express* attempts to mitigate this problem, but frequently stumbles. While many of its effects include an Advanced Mode button that adds some parameter controls, these controls generally involve sliders instead of numeric inputs, which makes it nearly impossible to create exactly the effect you're looking for. These constraints extend throughout the program, even to the file-save dialogue, which doesn't include variable compression options for JPEGs.

Despite these limitations, *Photo Express* offers some solid features for anyone who's willing to dig through the muck. The text tool includes advanced features such as letter-form shaping and wrapping, although text manipulation can't be applied to individual characters. You also get some nice text treatment tools, many of which aren't egregiously gimmicky. And the app's transparency tools are exceptionally powerful and usually just a right-click away. The automatic shadow tool lacks perspective skew control, but is otherwise well-integrated and useful.

Not so nicely integrated—but still a lot of fun—is a panorama feature, which automatically stitches together a series of images into a Quicktime file that can be scrolled left or right. The effect is actually created with a second program, *Cool 360*, that installs along with *Photo Express* but isn't linked in any other way. There's not even a mention of it in the program manual! We were lucky enough to discover *Cool 360* in our Start menu.

Ultimately, spiffy features such as the integrated web browser, an *ACDSee*-style image browser, intuitive batch processing, powerful print options, and crafty cut-out projects can't offset the awkwardness of *Photo Express'* advanced tools. And we still don't like the clip art's added bloat.

—Brad Dosland

PLUSES
- Tons of stuff for the buck
- Great transparency controls
- Great online integration

MINUSES
- Too much crap to wade through
- Lacks precision control
- Too many cheesy effects and templates
- Hidden panorama feature, crouching problem

The Browse mode may look like the venerable *ACDSee* image browser, but don't be mistaken. While this mode is great for finding the right shot in a folder, it can't run presentations.

MAXIMUM PC VERDICT 6

$50 | Ulead | www.ulead.com
800.358.5323

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Blade of Darkness

THE HACK 'N' SLASH GENRE STRIKES BACK

As *Rune* and *Die by the Sword* proved, hack 'n' slash games tend to focus on certain elements of the "total gaming experience" at the expense of other elements. While *Rune* is lacking in gameplay, *Die by the Sword* is less than impressive visually.

Blade of Darkness, by contrast, delivers on all counts. The gameplay cuts far above and beyond previous hacking games, and *Blade of Darkness* delivers plenty of cool visuals in the form of spurting blood, decapitations, amputations, and other mutilations. Parents shouldn't be too alarmed, though—there's a lock available to block out the gore fest.

With a blade in hand, your opponents are sure to lose their heads...or arms... or legs...or...

Gameplay

Blade of Darkness sets you on a quest for a magical sword that'll stop Chaos from overcoming Order. The storyline is on the weak side, but who cares? If you've got the urge to smash creatures into pulpy pieces, you'll find satisfaction in this game's vivid, blood-spattering glory. Character classes, level advancement, and weapon specializations add an element of role-playing. You choose from four basic characters; each has specific strengths and weaknesses—each starts the game in a different part of the world, and each has a different set of combat moves. Gameplay crosses 18 levels, from wintry mountain fortresses to Arabian temples.

The best feature of *Blade of Darkness* is the option to switch between first- and third-person views. You say you like *Tomb Raider*'s playability? Then stay in third-person mode. *Quake III* is more your speed? Stick to first-person.

Blade of Darkness comes with built-in multiplayer features. The game allows a maximum of eight players per map, but only two can fight at once. This is unforgivable! With the amount of gore the game provides, slash-fests involving several players would promise to be blood-drenched festivals of death—and there's nothing we like better than role-playing through good, old-fashioned medieval massacres when we need a feel-good moment.

The lighting in *Blade of Darkness* is so real, we thought we were actually outside.

Technology

Rebel Act Studios designed the Rebel One game engine specifically for *Blade of Darkness*—and what an engine it is. The first time we saw the way *Blade of Darkness* handles lighting, we were stunned. Carry a torch up a dark stairway, then drop it. Now watch the light splay and dance across the walls as the torch tumbles down the steps. That scene alone provides enough eye candy to make the Rebel One engine noteworthy.

The game delivers many types of baddies, but gameplay becomes boring in early levels because not all of them are smart. Orcs are about as sharp as a boiled oyster and run directly at you. The knights in later levels aren't so stupid. You'll have to patiently dodge and circle these knowing bad boys and choose your attacks if you want to live long.

Rebel Act uses the Rebel One engine for cut scenes as well. Elegantly interspersed throughout the game, cut scenes even crop up during levels as your character moves about.

The environment is highly interactive, and almost anything that can be picked up can be used as a weapon. Crates and tables can be set afire, but the flames are poorly rendered. Reflections, on the other hand, are stunning and foster a realistic atmosphere.

Blade of Darkness isn't a typical role-playing game, but it's still a hardcore butcher shop in the classic hack-'n'-slash sense. Get it for the graphics and keep playing for the gore.

—Scott Tarr

PLUSES
- First- or third-person playability
- Totally customizable controls
- Extraordinary lighting effects

MINUSES
- Weak multiplayer
- Not enough outdoor levels

THE SPECS

3D CARD SUPPORT	Direct3D
3D AUDIO	DirectSound
MULTIPLAYER	TCP/IP, IPX
TOTAL PLAYERS	8

MAXIMUM PC VERDICT

TECHNOLOGY	9
GAMEPLAY	8

$40 | Codemasters
www.rebelact.net

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Clive Barker's Undying

WANNA SEE SOMETHING *REALLY* SCARY?

Horror-movie master Clive Barker worked as a consultant on *Undying*, which landed his name on the box even though his contribution came late in the game's development. We think Dreamworks Interactive could have used some of Barker's story-telling magic from the very beginning, because while *Undying* is creepy, the first-person shooter isn't entirely compelling.

The story revolves around Patrick Galloway, an Irish ghostbuster of the 1920s who met horrible monsters in the trenches of World War I. The experience introduced Patrick to the supernatural and awakened his own dormant magical powers. Patrick quickly finds himself embroiled in a pulp-fiction-era horror story.

Diaphanous curtains and diabolical creatures help create an oppressive atmosphere in *Undying*.

PLUSES
- Excellent graphics and architecture
- Genuine scares, thrills, and chills
- Challenging AI

MINUSES
- Inconsistent story
- Little sense of purpose
- No multiplayer

THE SPECS

3D CARD SUPPORT
Direct3D

NETWORK SUPPORT
None

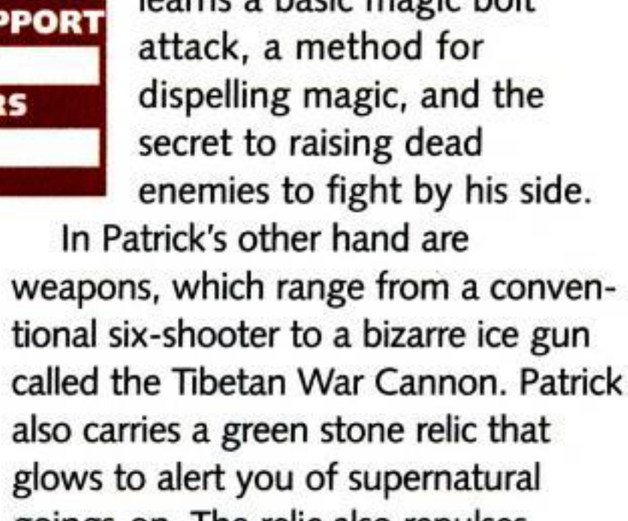
TOTAL PLAYERS
1

Gameplay

With one hand, Patrick commands various spells. He begins the game with Scrye, an incantation that lets him see in the dark, glimpse into the netherworld, and cause living and undead things to glow blue. Later in the game, Patrick learns a basic magic bolt attack, a method for dispelling magic, and the secret to raising dead enemies to fight by his side.

In Patrick's other hand are weapons, which range from a conventional six-shooter to a bizarre ice gun called the Tibetan War Cannon. Patrick also carries a green stone relic that glows to alert you of supernatural goings-on. The relic also repulses attacking creatures, which comes in handy when fending off the unusual attacks of *Undying*'s creatures.

The best part of *Undying* is its gallery of enemies. You often hear them before you see them, and they all attack differently. Howlers lope, leap, and rake at you with their massive claws. Large snake-octopus hybrids melt into the ground and reappear behind you. Animated skeletons rush you with absolute abandon. (And why *should* they be flustered by your counterattack? They're already dead!) When a creature strikes, perspective shifts as Patrick snaps his head around. It's disorienting and vividly conveys the inflicted damage. When Patrick dies, some monsters will rip off and devour his head or heart.



Calamari, anyone?

Unfortunately, the back story isn't as vivid as the creatures. Mostly described in superfluous journal entries, the story tells you where to go and what to do next, but it never clearly establishes its own sense of purpose. But, the action comes fast and furious, and you never have to think too deeply about the plot—or lack thereof.

Technology

Undying uses the *Unreal Tournament* engine, which proves well-suited to rendering the unique creatures and deeply atmospheric environment. Massive textures, dynamic lighting, and support for 32-bit color make this game a drain on even 1GHz systems with anything but the latest generation of graphics cards.

The manor house features realistic interior architecture, ranging from vaulted ceilings and a beautiful but run-down chapel to a mist-choked basement and a dust-covered kitchen. Dreamworks touts new "cloth-texturing" as a significant advance in game graphics—and it truly is. The effect isn't spectacular, but muslin curtains billowing across a hallway and clothing moving with the rustling wind convey a strong sense of realism. In general, the game uses its graphical tricks to create an oppressive atmosphere, and we never felt we were simply watching a showcase of gratuitous special effects.

Clive Barker's *Undying* features solid action, excellent combat AI, great spells and weapons, and solid scares. But all that is weighed against a story that never offers a compelling reason to keep playing.

—Andrew S. Bub

MAXIMUM PC VERDICT

TECHNOLOGY	8
GAMEPLAY	9

$45 | EA | www.undying.ea.com
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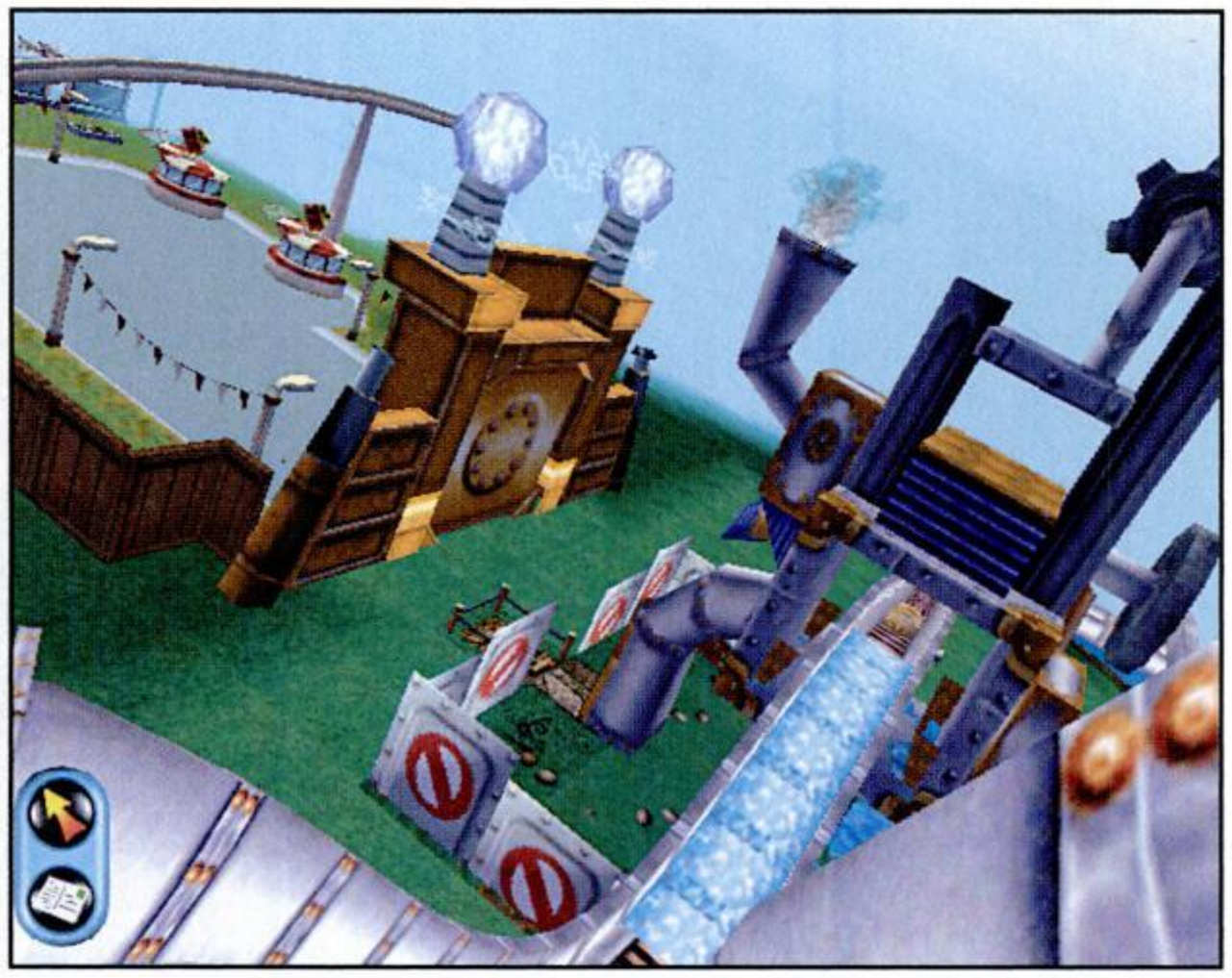
SimCoaster

ROLLER COASTERS FOR DUMMIES

It would be trite and petty to pigeonhole *SimCoaster* as a prettied-up *RollerCoaster Tycoon*.

Trite and petty, but accurate. Granted, EA, Maxis, Bullfrog, or whatever it's called this week has greater authority in this genre because its original *Theme Park* was the template for all such games. *Theme Park*, after all, inspired *RollerCoaster Tycoon*. Bullfrog answered with *Sim Theme Park*, an interesting though flawed effort that barely dented *RCT*'s dominance of this strange little genre.

SimCoaster is essentially *Sim Theme Park* tidied up, smoothed out, and streamlined, with just enough new features to make it a sequel.



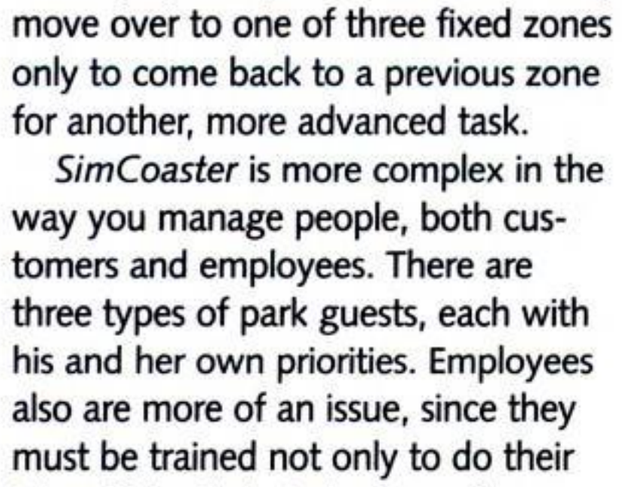
***SimCoaster* challenges *RollerCoaster Tycoon* in the strange little genre of roller coaster sims.**

Gameplay

In a very slight way, *SimCoaster* takes the franchise back to its *Theme Park* roots as a management sim. Whether you think this is an improvement depends upon whether you want to play a strategy game or prefer to just play with the rides.

Beginning as a park manager with a small lot of land, you expand your territory by completing tasks. You may move over to one of three fixed zones only to come back to a previous zone for another, more advanced task.

SimCoaster is more complex in the way you manage people, both customers and employees. There are three types of park guests, each with his and her own priorities. Employees also are more of an issue, since they must be trained not only to do their jobs efficiently but also to perform tasks required by mission parameters. An objective might involve rehabilitating a broken-down ride, which requires certain skills and technology. Other challenges might simply involve collecting golden tickets, keeping a certain number of people in the park, or preventing a strike.



Physics? Schmysics! *SimCoaster* pays no attention to the intricacies of roller coaster design—which means that virtually any crazy track design will work.

Researchers are also crucial, since they unlock not only technology and rides but also essential skills for your other employees. Training and deploying employees and dealing with customers are key to progressing in the game, which is a radical shift of focus from *Sim Theme Park*. Some may indeed see these as natural, game-based challenges, while others might reasonably be annoyed at being continually locked off from key parts of the game by seemingly arbitrary assignments. It tends to interfere with the freewheeling park-building element that many cherish, but it also gives the game structure.

Technology

SimCoaster is clearly built on the 1999 *STP*, and the graphics are beginning to look a little ragged. New movies, rides, and interface conventions have been added, but the cartoon-style visuals are unchanged. The game is not only still sorely lacking in shortcut keys, but it also has a clumsily piled layer of bulky windows and other functions on top of it all.

A new, stand-alone coaster designer has been added, allowing you to tinker with your coasters without the constraints of park landscape and objectives. Since these coasters lack the physics of *RCT*, you can pretty much stick a track anywhere and have it work.

SimCoaster shifts the emphasis from *STP*'s park-building back to the park management of the original *Theme Park* and *RollerCoaster Tycoon*. Aside from some awkward controls, this new element works well, adding new challenges and more drama to a design that was somewhat lacking. It's short on the depth and nuance of *RCT*, but is redeemed by the immediacy of its 3D world.

—Thomas L. McDonald

PLUSES
- New management model adds a welcome layer of strategy
- Camcorder mode gives a nice view of the park
- Coasters are easy to build

MINUSES
- Clumsy interface conventions and few hotkeys
- Graphics are a bit rough
- Zero physics on coasters

THE SPECS

3D CARD SUPPORT
Direct3D, Glide

3D AUDIO
DirectSound

TOTAL PLAYERS
1

MAXIMUM PC VERDICT

TECHNOLOGY	8
GAMEPLAY	6

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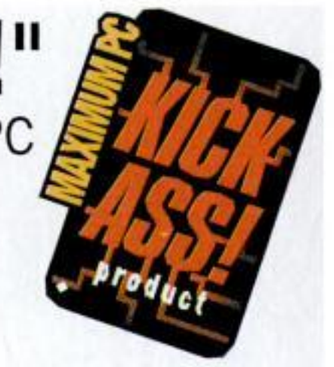

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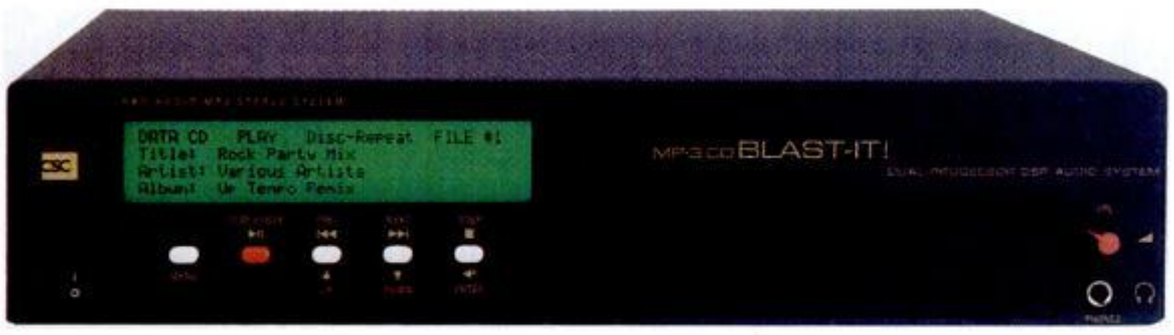

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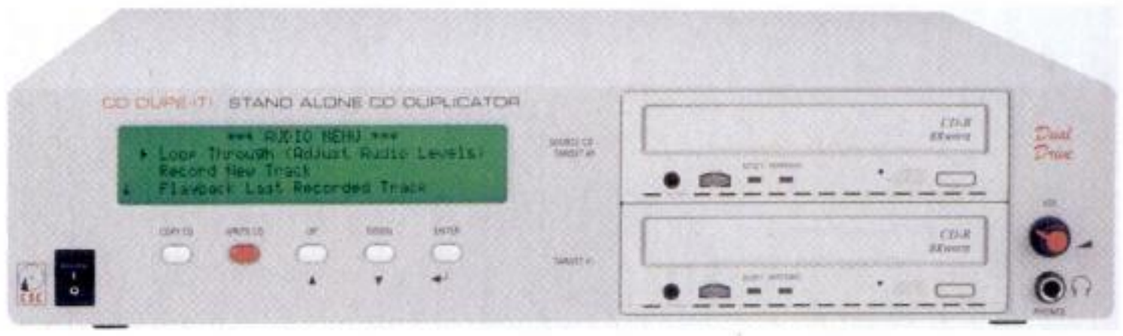
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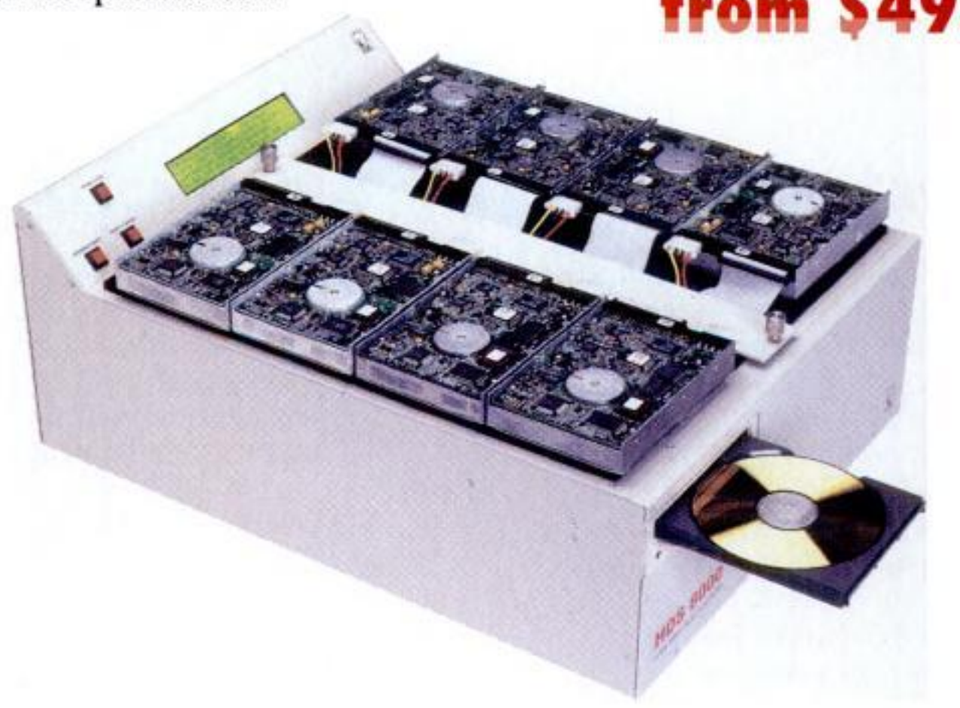

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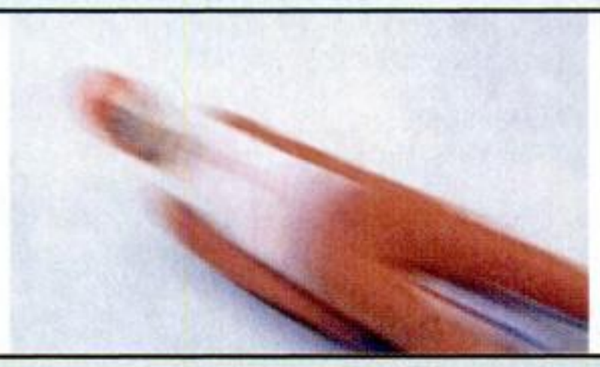

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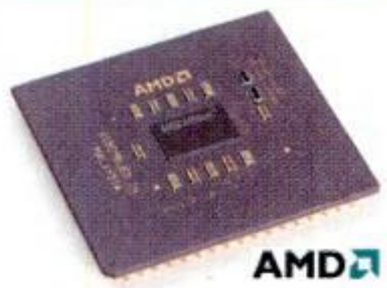

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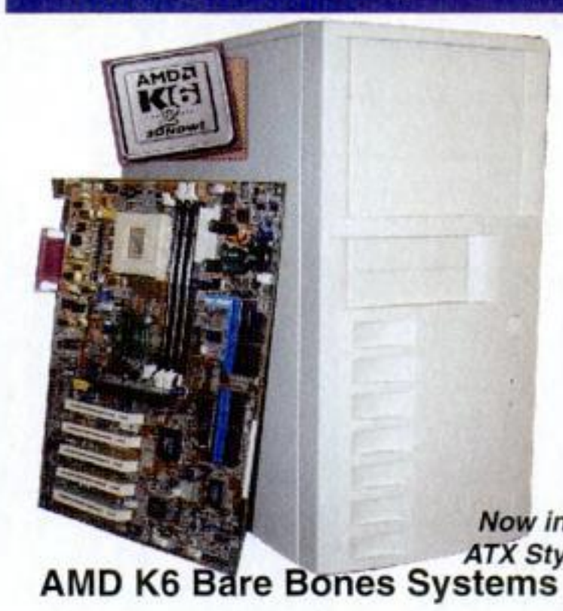

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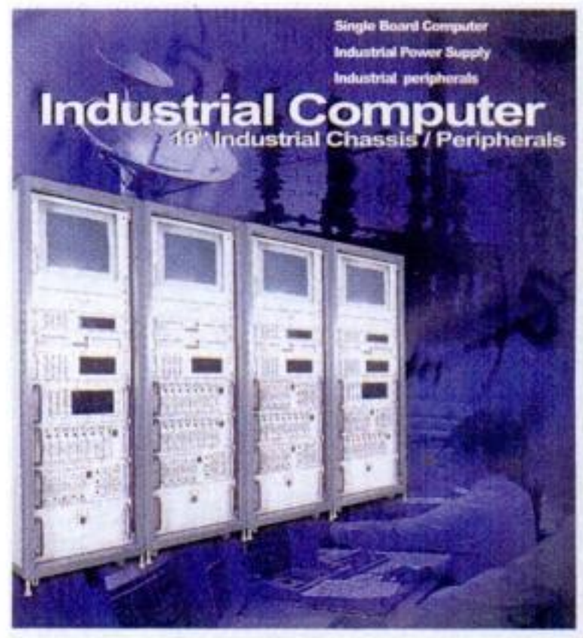

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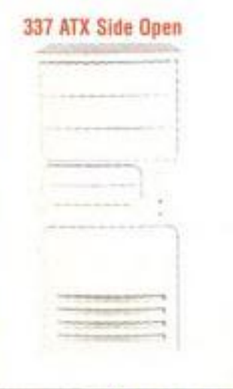

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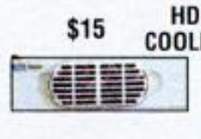

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104NLX/BX slot 1	460	11.2x13.5x3.4	PS2 KB,mouse,VGA,USB,RJ45,2S,1P,AUDIO,GAME	w/FD & Slim CD		2/1	or 1
105LPX socket 370	375	11.9x12.6x3.4	PS2 KB,mouse,VGA,USB,RJ45,2S,1P,AUDIO,GAME, IR	1	1/1	2	0
106 socket 7	260	12.4x14.5x3.4	PS2 KB,mouse,VGA,USB,RJ45,2S,1P,AUDIO, GAME	1	1/1	2	or 0
108NLX socket 370	375	12.4x14.5x3.4	PS2 KB,mouse,VGA,USB,RJ45,2S,1P,AUDIO,GAME, IR	1	1/1	2	or 1
192 370/II Micro ATX	220	12.1x16.5x3.5	PS2 KB, mouse, VGA,2S,1P,AUDIO	1	1/1	2	& 0

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R04B/W	290	19x24.3x3.5	ATX	1/0	1/3	250W
R08 B/W	1675/2300	19x22x3.5				
R12 B/W	305	19x19.7x7	B/ATX	4/0	1/0	250W
R14 B/W	230	19x21x7	B/ATX	3/0	1/3	300W
R15	325/550	19x24.4x7	ATX	6/0	2/2	300W
R16 B/W	240	19x18x7	B/ATX	3/0	1/2	250W
R20 B/W	290	19x20.5x7		8/0		300W
R21 B/W	290	19x18x7		8/0		300W
R22R/B/W	635/950	19x23.3x10.5	ATX	8/0	1/0	300W/R
R26R/B/W	630/850	19x22.6x10.7	ATX	4/0	2/4	300W/R
R28	290	19x17x8.7		8/0		300W
RSP	18	5.8x9.3x1.6			1	
RSM169	65/75	5.8x9.3x1.6			1	
001B	75	10x11.5x3		1/0		60W
001B1	65	8.3x10.6x2.8		1/0		50W
002B	88	6.9x14.6x5.8		2/0		60W
002B1	78	7.5x11.2x6.5		2/0		80W
004B	105	6.8x15.3x9.3		4/0		230W
004B1	100	7.5x17.3x10.2		4/0		200W
007B	180	7x15.8x13		7/0		250W
008B	280	8.4x20.2x18.3		8/0		300W
008B1	180	7.5x17.9x17.1		8/0		250W
103LPX	330	12.4x14.5x3.4	LPX	1/0	1/1	85W
104NLX	460	12.4x14.5x3.4	NLX	1/0	1/1	85W
105LPX	375	11.9x12.6x3	LPX	1/0	1/1	90W
106LPX-7	260	12.4x14.5x3.4	LPX	1/0	1/1	85W
108NLX bare	375	11x13.6x3.4	NLX	1/0	1/1	135W
192M.ATX	85	13.1x16.5x3.5	M.ATX	1/0	1/1	150W
224	75	17.4x18.8x6.1	ATX	3/0	2/2	230W
267	75	16.8x16.8x6.2	ATX	2/0	2/1	250W
271	90	17.3x15.9x5.5	ATX	2/0	1/1	250XB
288	75	16.9x17x6	ATX	3/0	2/1	230W
325B	75	8x18.5x17	ATX	3/0	2/1	235W
327	72	7.5x16.5x17.3	ATX	3/0	2/2	230W
337	88	7.8x18.8x16.5	ATX	3/0	2/2	300W
338	55	7x14.7x13.8	M. ATX	2/0	2/1	145W
366	50	7.2x15.5x14.3	M. ATX	2/0	1/1	235W
367	55	7.7x16.5x17	ATX	3/0	2/1	235W
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392	80	7.5x17x17	ATX	3/0	2/2	250W
393	95	9x17.5x17.5	ATX	6/0	1/1	250W
396	55	8.3x17x15.5	ATX	3/0	1/3	230W
401	110	8.5x17.3x18	ATX	2/0	2/2	250W
408	80	8.2x19.8x18.4	ATX	3/0	1/5	250W
411	67	7.2x17.2x16.8	ATX	4/0	2/1	250W
412	67	7.2x17.2x16.8	ATX	4/0	1/2	250W
413S/BL	67	8.5x19.5x18	ATX	4/0	2/1	250W
414P	67	7.2x20x16.8	ATX	4/0	2/1	250W
422	70	7.7x16.6x18.1	AT	4/0	1/4	250W
424	70	7.5x18.9x16.7	ATX	4/0	2/1	250W
426B/W/S	80	7.5x17.5x19.3	ATX	3/0	2/2	250W
436	70/85	8.6x18x15.6	ATX	3/0	2/2	250/300W
455	110	8.5x17.5x18.6	ATX	4/0	2/3	250W
465	195	9.3x17x17.2	XEON/ATX	2/0	2/2	300W
467	85/100	7.5x16.7x18.8	ATX	3/0	2/4	250W/300W
470	110	8.3x17.3x21.3	ATX	4/1	1/2	250WB
472	60	7.5x18x17.6	ATX	4/0	2/2	250W
482B	80	7.8x19.8x17.5	ATX	4/0	2/2	250W
486	67	9.6x19.5x17	ATX	4/0	2/1	250W
489**	85	7.3x17x17	ATX	3/0	1/2	235W
490	70	8.5x15.5x15	ATX	2/0	2/2	250W
491B	70	8.5x15.5x15	ATX	2/0	2/2	250W
496	60	8.25x17.8x16.5	ATX	4/0	1/3	250W
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503R/B	455	14.8x20.4x18.4	ATX	8/0	2/4	300RW
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528	95/110	7.5x16.5x24.8	ATX	6/0	1/5	250W/300W
536	93/108	7.8x17x24	ATX	5/0	1/5	250W/300W
538	290	8x20.5x24.5	ATX	5/0	1/6	300RW
555/B/R	440/680	11x19.3x23.6	F	4/8	0/0	400W/300R
555/R	440/700	11x19.3x23.6	ATX	4/8	0/0	300W/300R
560/R	290/445	15x24.5x23.5	ATX	11/0	2/4	300W/300R
562/R/B/W	250/470	8.7x17.9x26.8	ATX	9/1	1/0	300W/300R
563/RB/W	145/370	8.7x17.9x26.8	ATX	10/0		300W/300R
565	195	9.25x18.3x21.2	XEON/ATX	4/0	2/4	300W
568	105/120	7.5x17x22.8	ATX	5/0	2/4	250W/300W
569B/W	225	13.5x17.8x14	B/ATX	6/2	0/8	300W/300W
570/R	150/370	8.3x17.3x26.4	ATX	7/1	1/2	300W/300R
571/R	160/370	8.3x17.3x26.4	ATX	6/1	1/2	300W/300R
582	105/120	7.8x16.5x23.2	ATX	6/0	2/1	250W/300W
588	105/120	7.8x16.5x23.3	ATX	5/0	1/3	250W/300W
1400/R	715	16x20x24	F/ATX	14/0		300R
1620/R	950	16.5x20.3x34.3	F/ATXx2	16/0		300R

*Case Color: Blue, Purple, Green, Orange, Red.
**Case Color: Blue, Purple, Green, Red, Black.

Model# Starts with:
1 for Slim Case
2 for Desktop Case
3 for Mini-Mid Case
4 for Mid Case
5 for Full/File Server Case
Side Open: Side Panel can be removed independently
Slide Door: Sliding front door up and down
Slide MB Plate: Motherboard tray ca slide in and out form rear
MB SIZE = MOTHERBOARD SIZE • F= FULL SIZE • B= BABY SIZE
X=ATX • M. ATX= Micro ATX
R= REDUNDANT POWER SUPPLY WITH HARDSWAP
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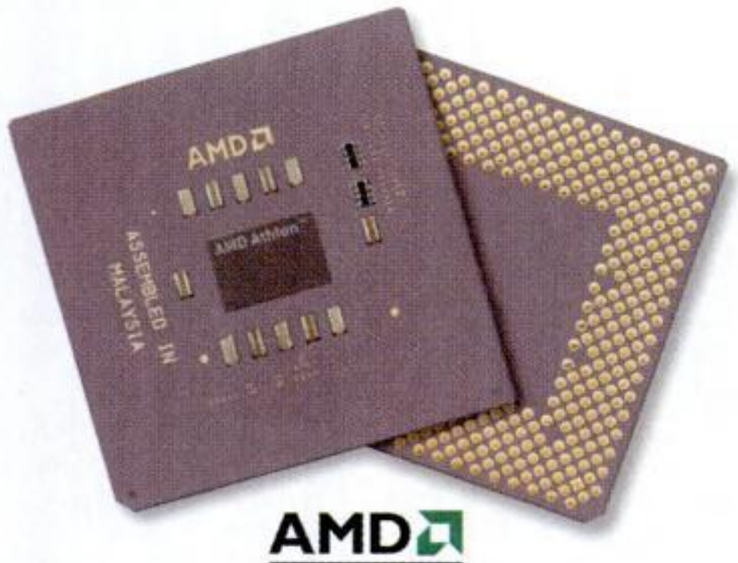

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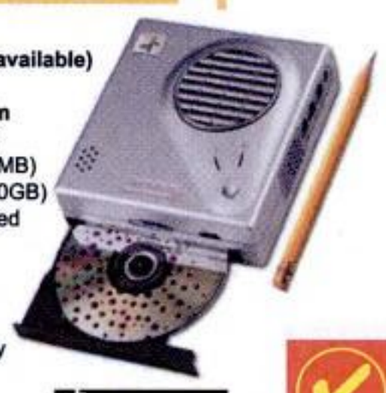

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INTEL PENTIUM III 866	$ 1309	(drmx056)
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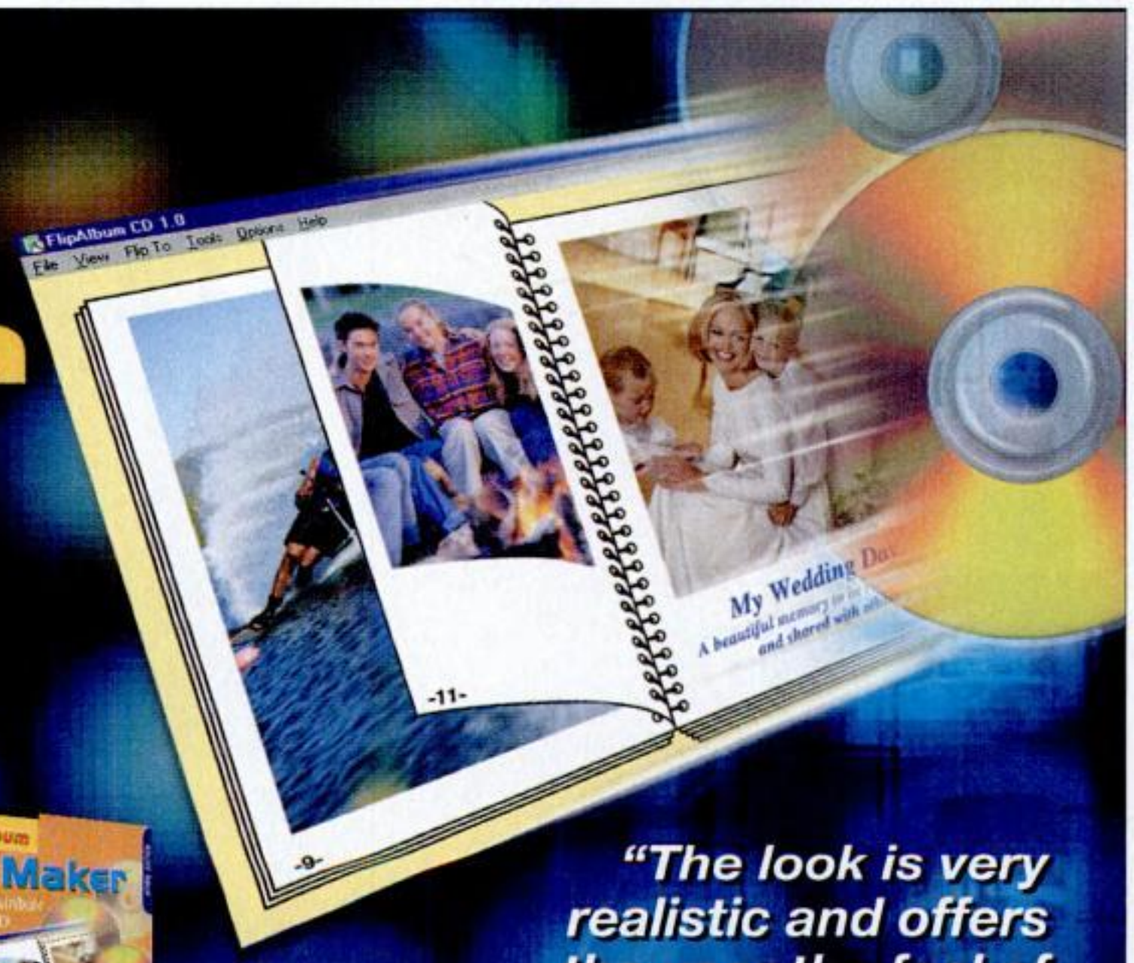

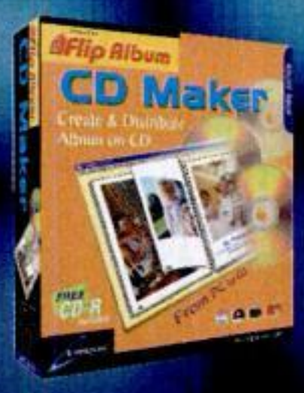

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• Mastering Your PDA

It's your little buddy, your computer away from home, the shuttlecraft to your PC's Starship Enterprise. It's your Personal Digital Assistant, and it's time to master its every move. We'll show you how to buy the perfect PDA, how to perfectly sync data between your PDA and PC, and how to pick winners from the obscenely large pool of PDA software. And if you're trying to decide between Palm and PocketPC, we've got just the showdown you've been looking for.

• Big-Screen Displays

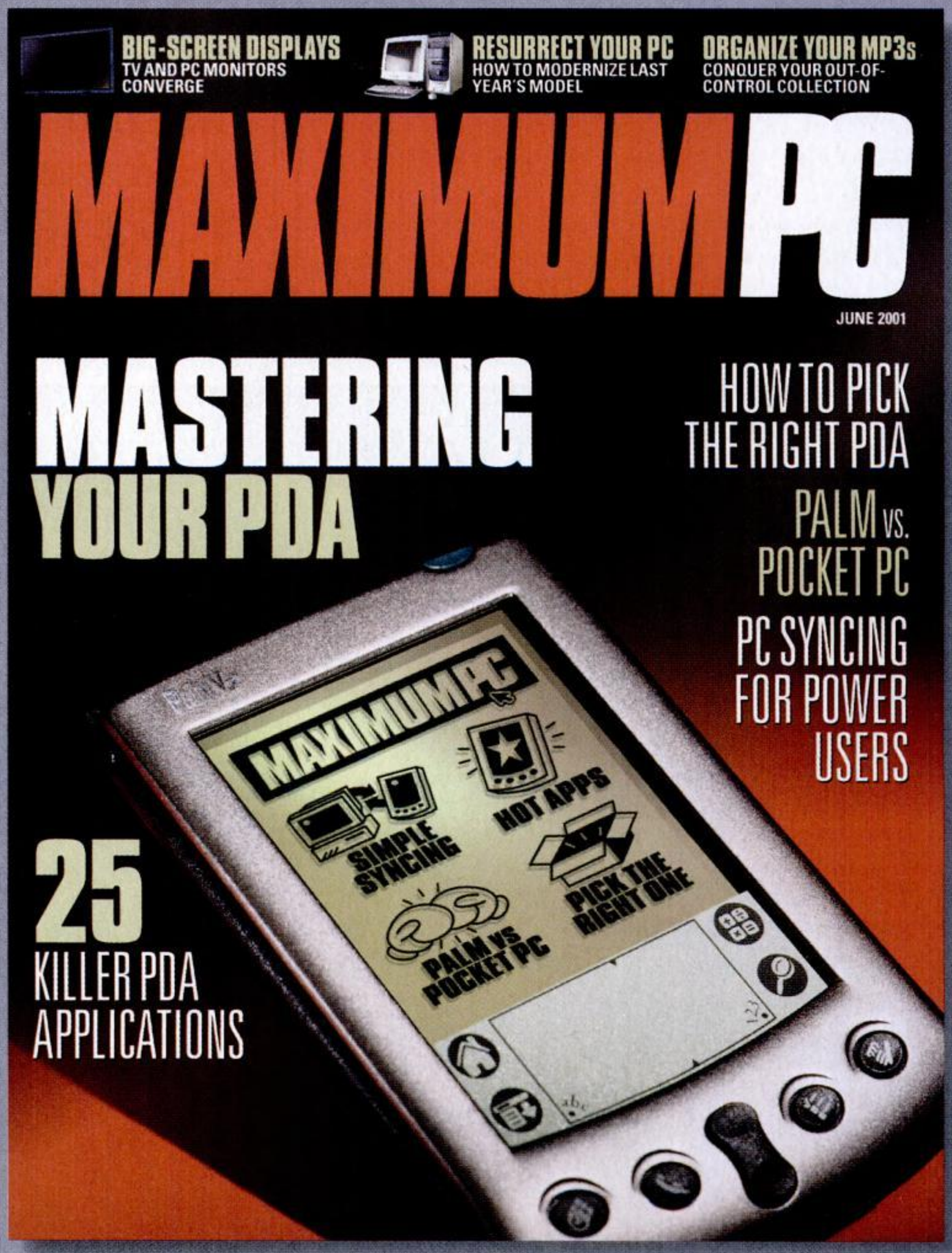
Yes, you *can* use your PC to play games and watch DVD movies in your living room—if you have the right big-screen, high-resolution display. We've got HDTV rear-projection, plasma, LCD projectors, and old-school CRTs on steroids. Who knows, by press time we might even have one of the DLP rear-projectors that threatens to render all other big-screen monitors obsolete. We'll clue you in on each display's pluses and minuses, and review the hottest products.

• Resurrect Your PC

Is your PC a dilapidated junk heap? Has it ever been cleaned from top to bottom? Have you ever upgraded even a single part? If your PC is looking like a rag-tag shanty, it's time to whip it into tip-top shape. We walk you through three PC resurrection case studies, spit-shining and upgrading with abandon.

• Gaming Awards

Which was a better creative effort, the movie *Battlefield Earth* or the game *Deus Ex*? Indeed, our point exactly. Next month we present an awards show that's long overdue. From graphics to audio to storyline, we pay tribute to the parts of games that blew our minds. And the award for Funniest Piece of Dialogue in a Campy Swinging '60s Thriller goes to...



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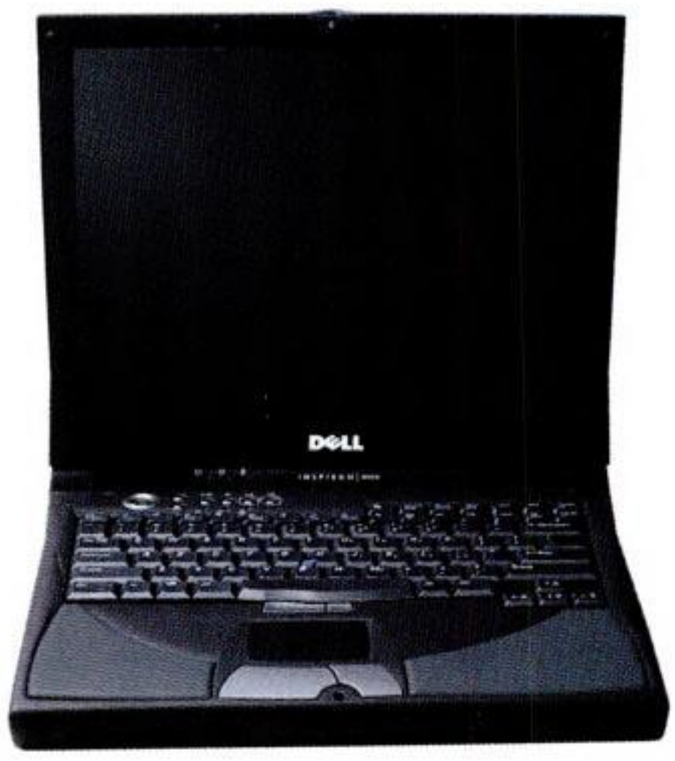

Dell™ Inspiron™ 8000 Notebook

DELL™ NOTEBOOKS:

DELL™ INSPIRON™ 4000

Thin and Light

- Intel® Celeron™ Processor at 700MHz
- 14.1" XGA TFT Display
- 64MB 100MHz SDRAM
- 5GB[5] Ultra ATA Hard Drive
- Modular 24X Max CD-ROM Drive
- 8MB ATI Rage Mobility™ 128 3D® 2X AGP Video
- Internal 56K Capable[6] FaxModem
- Li-Ion Battery w/ExpressCharge™ Technology
- MS® Works Suite 2001 ■ MS® Windows® Me
- 1-Yr Limited Warranty[2] ■ 1-Yr Mail-in Service
- 1 Year of DellNet™ by MSN® Internet Access[10] Included

$1349 or as low as **$41** per mo. 45 mos.[12]

No payments for 90 days. E-VALUE Code: 89043-800413

DELL™ INSPIRON™ 8000

Multimedia Mobile Desktop

- Intel® Pentium® III Processor at 700MHz
- 14.1" Super XGA+ TFT Display
- 128MB 100MHz SDRAM
- 10GB[5] Ultra ATA Hard Drive
- Fixed 8X Max DVD-ROM Drive
- 32MB ATI Mobility™-M4 3D® 4X AGP Video
- Internal 56K Capable[6] FaxModem
- 59WHr Li-Ion Battery ■ harman/kardon® Audio
- MS® Works Suite 2001 ■ MS® Windows® Me
- 1-Yr Limited Warranty[2] ■ 1-Yr Mail-in Service
- 1 Year of DellNet™ by MSN® Internet Access[10] Included

$1979 or as low as **$59** per mo. 45 mos.[12]

No payments for 90 days. E-VALUE Code: 89043-800419

DELL™ INSPIRON™ 8000

Multimedia Mobile Desktop

- Intel® Pentium® III Processor at 1GHz
- 15" Super XGA+ TFT Display
- 128MB 100MHz SDRAM
- 20GB[5] Ultra ATA Hard Drive
- Fixed 8X Max DVD-ROM Drive
- 32MB ATI Mobility™-M4 3D® 4X AGP Video
- Internal 56K Capable[6] FaxModem
- 59WHr Li-Ion Battery ■ harman/kardon® Audio
- MS® Works Suite 2001 ■ MS® Windows® Me
- 1-Yr Limited Warranty[2] ■ 1-Yr Mail-in Service
- 1 Year of DellNet™ by MSN® Internet Access[10] Included

$2599 or as low as **$78** per mo. 45 mos.[12]

No payments for 90 days. E-VALUE Code: 89043-800425

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DELL™ DESKTOPS:

DELL™ DIMENSION™ L Series

Affordable Desktop Solution

- Intel® Pentium® III Processor at 933MHz
- 64MB SDRAM
- 20GB[5] Ultra ATA/100 Hard Drive
- 15" (13.8" vis) E551 Monitor
- Intel® 3D® AGP Graphics
- 48X Max CD-ROM Drive
- SoundBlaster 64V PCI LC Sound Card
- harman/kardon® Speakers
- 56K Capable[6] PCI DataFax Modem
- MS® Works Suite 2001 ■ MS® Windows® Me
- 1-Yr Limited Warranty[2] ■ 1-Yr At-Home Service[4]
- 1 Year of DellNet™ by MSN® Internet Access[10] Included

$799 or as low as **$24** per mo. 45 mos.[12]

No payments for 90 days. E-VALUE Code: 89043-500407

DELL™ DIMENSION™ 4100 Series

Advanced Performance, Smart Value

- Intel® Pentium® III Processor at 1GHz
- 64MB SDRAM at 133MHz
- 20GB[5] Ultra ATA/100 Hard Drive (7200 RPM)
- 17" (16.0" vis) E770 Monitor
- 16MB ATI Rage™ Pro
- NEW 8X/4X/32X Max CD-RW/DVD Combo Drive
- SB Live! Value Digital
- harman/kardon® Speakers
- 56K Capable[6] PCI Telephony Modem
- MS® Works Suite 2001 ■ MS® Windows® Me
- 3-Yr Limited Warranty[2] ■ 1-Yr At-Home Service[4]
- 1 Year of DellNet™ by MSN® Internet Access[10] Included

$1299 or as low as **$39** per mo. 45 mos.[12]

No payments for 90 days. E-VALUE Code: 89043-500412

DELL™ DIMENSION™ 8100 Series

Cutting-Edge Technology

- Intel® Pentium® 4 Processor at 1.3GHz
- 128MB RDRAM
- 40GB[5] Ultra ATA/100 Hard Drive (7200 RPM)
- 17" (16.0" vis) P780 FD Trinitron® Monitor
- NEW 32MB NVIDIA™ GeForce2 MX 4X AGP Graphics
- 48X Max CD-ROM Drive
- SoundBlaster 64V LC PCI Sound Card
- Harman Kardon® HK-695 Surround Sound Speakers with Subwoofer
- 56K Capable[6] PCI Telephony Modem
- MS® Works Suite 2001 ■ MS® Windows® Me
- 3-Yr Limited Warranty[2] ■ 1-Yr At-Home Service[4]
- 1 Year of DellNet™ by MSN® Internet Access[10] Included
- APC Pro8T2 SurgeArrest Surge Protector

$1699 or as low as **$51** per mo. 45 mos.[12]

No payments for 90 days. E-VALUE Code: 89043-500416

DELL™ DIMENSION™ 8100 Series

Cutting-Edge Performance

- Intel® Pentium® 4 Processor at 1.4GHz
- 128MB RDRAM
- 60GB[5] Ultra ATA/100 Hard Drive (7200 RPM)
- 19" (18.0" vis, .26dp) M991 Monitor
- 32MB DDR ATI Radeon™ 4X AGP Graphics
- NEW 16X Max DVD-ROM Drive
- SB Live! Value Digital
- Harman Kardon® HK-695 Surround Sound Speakers with Subwoofer
- 56K Capable[6] PCI Telephony Modem
- MS® Works Suite 2001 ■ MS® Windows® Me
- 3-Yr Limited Warranty[2] ■ 1-Yr At-Home Service[4]
- 1 Year of DellNet™ by MSN® Internet Access[10] Included
- APC Pro8T2 SurgeArrest Surge Protector

$1999 or as low as **$60** per mo. 45 mos.[12]

No payments for 90 days. E-VALUE Code: 89043-500419

DELL™ SOLUTIONS:

SOFTWARE & ACCESSORIES

Printers:

- Epson® Stylus 777 Color Printer, add $99
- HP® DeskJet® 952C, add $149 after $50 HP® Mail-in Rebate[38] (Reg. $199)

Scanner:

- HP® ScanJet® 4300Cse, add $99 after $50 HP® Mail-in Rebate[38] (Reg. $149)

Power Protection:

- APC Pro8T2 SurgeArrest, add $39

Software:

- Extreme Game Pack (Dimension™ only)[16], add $99
- Family Game Pack[16], add $99

FINANCING & SERVICES

Payment Solutions:

- Dell™ Monthly Purchase Plan – Enjoy easy-to-budget, low monthly payments. Systems as low as $24 a month for 45 months[12] for qualified customers using the 90 Days Same As Cash feature of the plan

Dimension™ Desktop Service Upgrades:

- Upgrade Dimension™ L Series 1-Yr Ltd Warranty[2], 1-Yr At-Home Service[4] to Premier 3-Yr At-Home Service[4], add $119

Inspiron™ Notebook Service Upgrades:

- Upgrade Inspiron™ Notebooks with 1-Yr Ltd Warranty[2] and 1-Yr Mail-in Service to:
  - 3-Yr Warranty[2] and 3-Yr Mail-in Service, add $99
  - 3-Yr Warranty[2] and 3-Yr On-site Service[4], add $219

intel inside pentium® III

Includes Windows Millennium Edition — the home version of the world's favorite software.

[10]Telephone access (call your phone co. for details) and other surcharges for access may apply. Must register within 30 days of receiving computer and accept DellNet/MSN Terms of Service. You agree to be billed monthly fees after the initial service period. You may cancel service at any time. Offer valid for new customers only in U.S. households and must be over 18 years old with major credit card. Limited time offer. [12]**Monthly payment based on 13.99% APR FOR QUALIFIED CUSTOMERS. OFFER VARIES BY CREDITWORTHINESS OF CUSTOMER AS DETERMINED BY LENDER. Under 90 Days Same As Cash feature, interest accrues during first 90 days if balance not paid within 90 days. Customers not eligible for 90 Days Same As Cash feature may be offered standard 48-month financing with APRs ranging from 16.99% to 23.99%. Example: $1,650 purchase price, at 18.99%, 48 monthly payments at $50. Taxes and shipping charges extra, and vary. From American Investment Bank, N.A. to U.S. residents with approved credit. Availability may be limited in some states. Limited time offer.**

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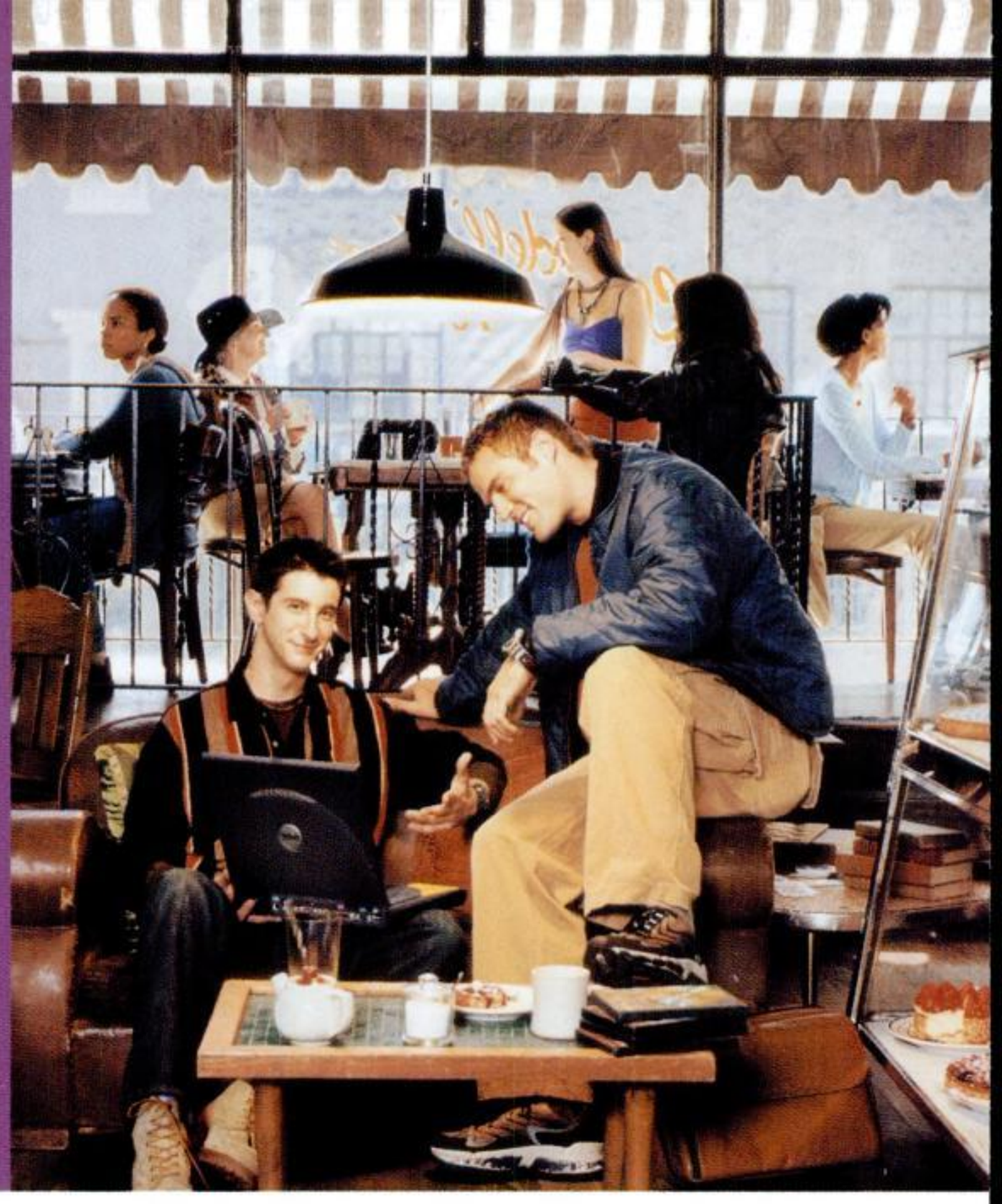
is it a notebook that doubles as an entertainment center or an entertainment center that doubles as a notebook? yes.



DELL™ INSPIRON™ 8000

Multimedia Mobile Desktop

- Intel® Pentium® III Processor at 1GHz
- 15" Super XGA+ TFT Display
- 128MB 100MHz SDRAM
- 10GB[5] Ultra ATA Hard Drive
- Fixed 8X Max DVD-ROM Drive
- 32MB ATI Mobility™-M4 3D® 4X AGP Video
- Internal 56K Capable[6] FaxModem
- 59WHr Li-Ion Battery ■ harman/kardon® Audio
- MS® Works Suite 2001 ■ MS® Windows® Me
- 1-Yr Limited Warranty[2] ■ 1-Yr Mail-in Service
- 1 Year of DellNet™ by MSN® Internet Access[10] Included

$2449 E•VALUE CODE 89042-800424

ASK US ABOUT NO PAYMENTS FOR 90 DAYS.

DELL RECOMMENDED UPGRADES:

- Additional 8X Max CD-RW Drive, add $299
- 20GB[5] Ultra ATA Hard Drive, add $149

Introducing the Dell™ Inspiron™ 8000. The most complete multimedia capabilities ever featured in a notebook.

With the Dell™ Inspiron™ 8000, you can carry your home entertainment system and your computer with you. Innovations like the 32MB video with 4X AGP graphics and harman/kardon® audio deliver sharper images and smoother transitions to bring games, movies and streaming video to life. And with dual optical devices, you can watch a DVD movie and burn a CD at the same time. With a notebook this fast and this powerful, you can do more wherever you are. It's just one more way Dell helps you get the most out of your PC.

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Includes Windows Millennium Edition — the home version of the world's favorite software.

[10]Telephone access (call your phone co. for details) and other surcharges for access may apply. Must register within 30 days of receiving computer and accept DellNet/MSN Terms of Service.

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my new pc doesn't raise the bar. it obliterates it.

DELL™ DIMENSION™ 8100 Series

Cutting-Edge Technology

- Intel® Pentium® 4 Processor at 1.4GHz
- 128MB RDRAM
- 40GB[5] Ultra ATA/100 Hard Drive (7200 RPM)
- 17" (16.0" vis, .24 – .25 AG) P780 FD Trinitron® Monitor
- NEW 32MB NVIDIA™ GeForce2 MX 4X AGP Graphics
- 48X Max CD-ROM Drive
- SB Live! Value Digital
- Altec Lansing® ACS 340™ Speakers with Subwoofer
- 56K Capable[6] PCI Telephony Modem
- MS® Works Suite 2001 ■ MS® Windows® Me
- 3-Yr Limited Warranty[2] ■ 1-Yr At-Home Service[4]

$1699 E•VALUE CODE 89041-500416b

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Introducing the Dell™ Dimension™ 8100 with an Intel® Pentium® 4 processor. Over-the-top performance for those who can handle it.

The Dell™ Dimension™ 8100 takes you to the next level and then some. We're talking speeds of up to 1.5GHz maximized by the latest Intel® Pentium® 4 processors. With up to 1GB of memory, you can multi-task without sacrificing performance. Arming you with quite possibly the fastest and most powerful desktop you've ever seen is just one more way Dell helps you get the most out of your PC. No matter how extreme your needs are.

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Includes Windows Millennium Edition — the home version of the world's favorite software.

[2]Telephone access (call your phone co. for details) and other surcharges for access may apply. Must register within 30 days of receiving computer and accept DellNet/MSN Terms of Service.

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